

NIDEK

**NON CONTACT TONOMETER
NT-510/NT-530/NT-530P**

SERVICE MANUAL

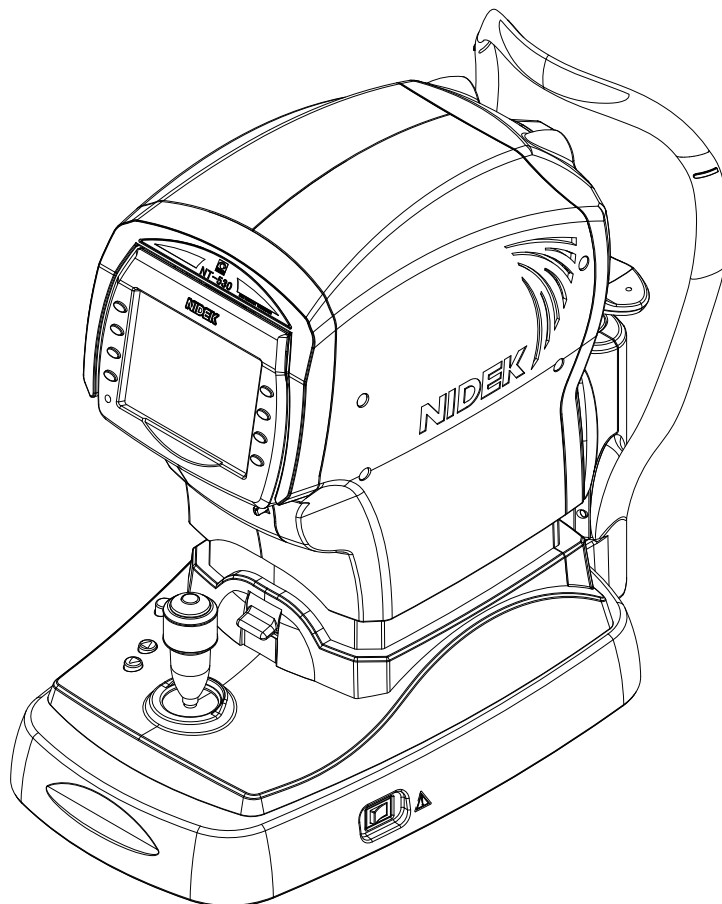


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1 INTRODUCTION

This Service Manual describes repair procedures of NON CONTACT TONOMETER, the NT-510/NT-530/NT-530P.

To conduct repairs properly, thorough understanding of the contents in this manual is required prior to the service.

Refer to the Operator's Manual and Parts List for the NT-510/NT-530/NT-530P.

In case the device cannot be repaired by the procedures described in this manual, please report the serial number of the device and details of the symptom or symptoms.

Refer to the Service Manual Annex for important changes.

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2 SAFETY PRECAUTIONS

1 . Requirements for prior contact regarding repair

- 1) When conducting repairs described in the Service Manual or Service Manual Annex, prior contact with NIDEK is not necessary.
- 2) When conducting repairs not covered in the Service Manual or Service Manual Annex, prior contact with the NIDEK Service Department in writing is required.
- 3) When for some reasons, repairs were conducted because they needed to be done immediately, or other such circumstance, contact NIDEK as soon as possible in writing after conducting repairs to the device.

2 . General precautions

- 1) Repairs by the Service Manual or Service Manual Annex must be performed by personnel who have undergone training at NIDEK.
- 2) Conduct repairs according to the procedures described in the Service Manual or Service Manual Annex.
- 3) Never wipe the covers using an organic solvent such as paint thinner.
Doing so may ruin the surface and impair the appearance of the device.
- 4) When conducting repairs, turn off the breaker of the device and disconnect the power cord from the wall outlet unless the power needs to be on.





3 . Cautions regarding power source and power cord

- 1) Disconnect the power cord by holding its plug. Do not place heavy objects on the cord or coil the cord tightly.
A damaged power cord may cause fire or electric shock.
- 2) Occasionally clean the prongs of the power plug with a dry cloth.
If dust accumulates between the prongs, the dust could collect moisture, and short circuit or fire may occur.
- 3) Fully insert the main power plug into an outlet. A fire may occur if the device is used with improper connection.
- 4) Do not overload the electrical outlet. A fire may occur.
- 5) Be sure to use an outlet equipped with a ground terminal.
Electric shock may result in the event of device malfunction or power leakage.
- 6) Be sure to use a wall outlet that meets the power requirements.
If the line voltage is too high or too low, the device may not perform properly. Electric shock, malfunction, or fire may result.

4 . Maintenance precaution

- 1) To sterilize the device, wipe the device exterior (especially the parts that come into contact with the patient) with a cloth dampened with rubbing alcohol.
- 2) To sterilize the air nozzle, clean it with a cotton swab dampened with rubbing alcohol.

5 . Maintenance cautions

- 1) Take antistatic precautions prior to repair.
- 2) Take proper care against electric shock during repair.
- 3) Tighten or loosen screws with proper tools.
- 4) Never drop parts or screws inside the device.
- 5) Prepare storage cases so as not to lose the removed screws or parts.
- 6) After loosening the screws fastened by a threadlocking adhesive, be sure to reapply the threadlocking adhesive to the screws when retightening them.
- 7) After replacing parts, confirm that they are fastened in their original positions securely before turning on the power.
- 8) See Wiring Diagram and Connecting Cable to check cable breaks as described in TROUBLESHOOTING. In addition, check cables for the following:
 - a . Connectors are connected and crimped properly.
 - b . No contact failure occurs after re-connection of connectors.
 - c . Cables are soldered properly.
- * Do not pull on the cables with excessive force. Doing so may result in cable breakage. Never conduct repairs with wet hands. Electric shock or failure of the device may result.
- 9) The  labeled area indicates high voltage. Take proper precautions against electric shock.
- 10) When a cable with any of the following marks is disconnected and reconnected, be sure to confirm that the screws are tightened securely.
 - a . Protective ground: 
 - b . Functional ground: 
 - c . Equipotential: 
- 11) Install the device where the outlet which the power plug is inserted into is easily accessible during use. In addition, ensure that the power plug can be disconnected without the use of a tool.

Otherwise, it may interfere with disconnection of the device from the input power source in case of abnormality.

6 . Adjustment precautions

- 1) Confirm that the following conditions are met before installation.
 - a . A place which is level and stable without vibration and shock
 - b . No exposure to direct sunlight or ultraviolet rays
 - c . A place with minimal external light sources
 - d . No exposure to water
 - e . A place where temperature and humidity meet the specifications for use
 - f . Dust-free and smoke-free
- 2) Never use the adjustment jigs for purposes other than those intended.

7 . Caution after repairs

- 1) Confirm that the device operates properly after repairs.

3 SPECIFICATIONS

3.1 Classifications

- 1 . Type of protection against electrical shock: Class I
 - 1) The NT-510, NT-530, and NT-530P are classified as Class I devices.
 - 2) A Class I device is one in which, in addition to basic insulation, protection against electric shock is provided by connecting the device to a grounding source to prevent accessible metal parts from becoming electrically charged, should the basic insulation fail.
- 2 . Degree of protection against electrical shock: Type B applied part
 - 1) The NT-510, NT-530, and NT-530P are classified as devices with a Type B Applied Part.
 - 2) A Type B Applied Part provides a particular degree of protection against electrical shock, particularly regarding the following:
 - allowable leakage current
 - reliability of the protective earth connection (if applicable)
- 3 . Conformity to electromagnetic compatibility standard
 - 1) The NT-510, NT-530, and NT-530P conform to IEC60601-1-2: 2007.
- 4 . Degree of protection against harmful ingress of water: IPX0
 - 1) The NT-510, NT-530, and NT-530P provide no protection against ingress of water with harmful effects.
 - 2) Avoid splashing water or other liquids on or near the device.
- 5 . Method (s) of sterilization or disinfection recommended by the manufacturer
 - 1) The NT-510, NT-530, and NT-530P include parts that need sterilization or disinfection.
- 6 . Degree of safety of application in the presence of a flammable anaesthetic mixture with air, or with oxygen or nitrous oxide
 - 1) The NT-510, NT-530, and NT-530P are not suitable for use in the presence of a flammable anaesthetic mixture with air, or with oxygen or nitrous oxide.
- 7 . Mode of operation
 - 1) The NT-510, NT-530, and NT-530P are continuous operating devices.
- 8 . Installation and use
 - 1) The NT-510, NT-530, and NT-530P are classified as stationary devices.

3.2 Safety Features

* To ensure safe use, the device is provided with the following safety features.

- 1 . Patient sensor
 - 1) Detects the presence of a patient in front of the device while checking the puffed air.
 - 2) When the sensor detects the patient, the puffed air check is not performed.
- 2 . Safety stopper
 - 1) Provides a safety space so that the air nozzle does not come into contact with the patient's eye during measurement.
 - 2) The amount of space needed for safety differs depending on the patient. Change the position of the stopper for each patient to secure the proper amount of space for safety.

3.3 Specifications

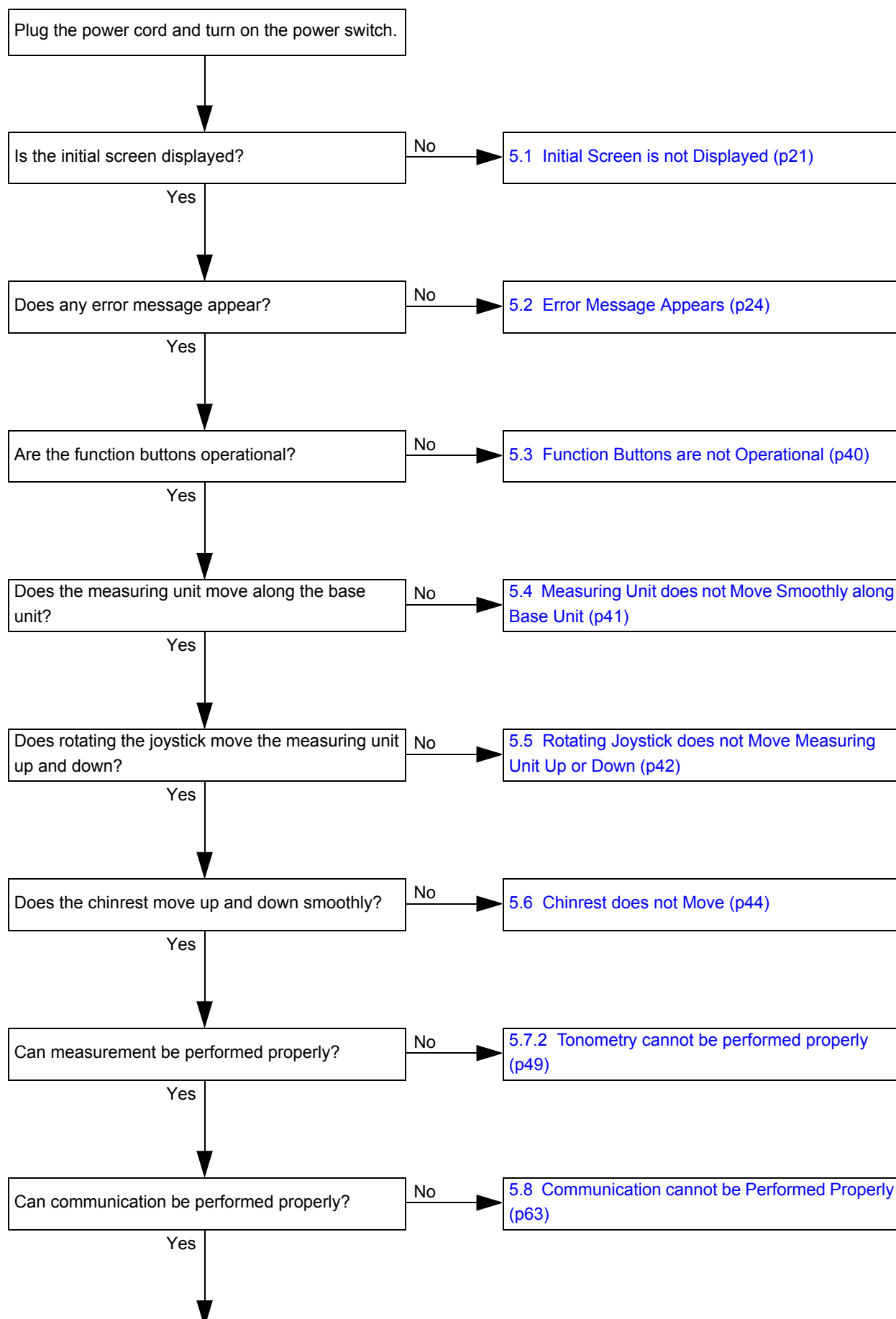
- 1 . Intraocular pressure measurement
 - 1) Measurable range 1 to 60 mmHg
Displayed as 1 mmHg
 - 2) Measurement range APC40, APC60, 40, 60
 - 3) Working distance 11 mm
 - 4) Chart Fixation target: Green (Selectable between the bilking target and continuously-lit target)
- 2 . Pachymetry (NT-530P only)
 - 1) Measurable range 150 to 1300 μ m
 - 2) Measurement increments 1 μ m
- 3 . Working range of auto-tracking
 - 1) Up and down 32 mm or more
 - 2) Right and left (except NT-510) \pm 5 mm
 - 3) Back and forth (except NT-510) \pm 5 mm
- 4 . Movable range of horizontal direction (by joystick)
 - 1) Back and forth 36 mm or more
 - 2) Right and left 85 mm or more
- 5 . Other functions
 - 1) Alignment/observation method 5.7-inch color LCD display
 - 2) Printer Thermal line printer with auto cutter
Width 58 mm
 - 3) Interface connectors
 - a . RS-232C: 1 port (OUT)
 - b . USB: 1 port
 - c . LAN: 1 port
- 6 . Dimensions and mass
 - 1) NT-510, NT-530
 - a . Dimensions 260 mm (W) \times 481 mm (D) \times 457 mm (H)
 - b . Mass 19 kg
 - c . Power source AC 100 to 240 V \pm 10%
50/60 Hz
 - d . Power consumption 100 VA
 - 2) NT-530P
 - a . Dimensions 260 mm (W) \times 481 mm (D) \times 474 mm (H)
 - b . Mass 20 kg
 - c . Power source AC 100 to 240 V \pm 10%
50/60 Hz
 - d . Power consumption 100 VA
- 7 . Environmental conditions (during use)
 - 1) Temperature 10 to 35 $^{\circ}$ C (50 to 95 $^{\circ}$ F)
 - 2) Humidity 30 to 90% (non-condensing)
 - 3) Atmospheric pressure 800 to 1060 hPa
 - 4) Others Dust-free and smoke-free
- 8 . Environmental conditions (during transport and storage)
 - 1) Temperature -10 to 55 $^{\circ}$ C (14 to 131 $^{\circ}$ F)
 - 2) Humidity 10 to 95% (non-condensing)
 - 3) Atmospheric pressure 700 to 1060 hPa

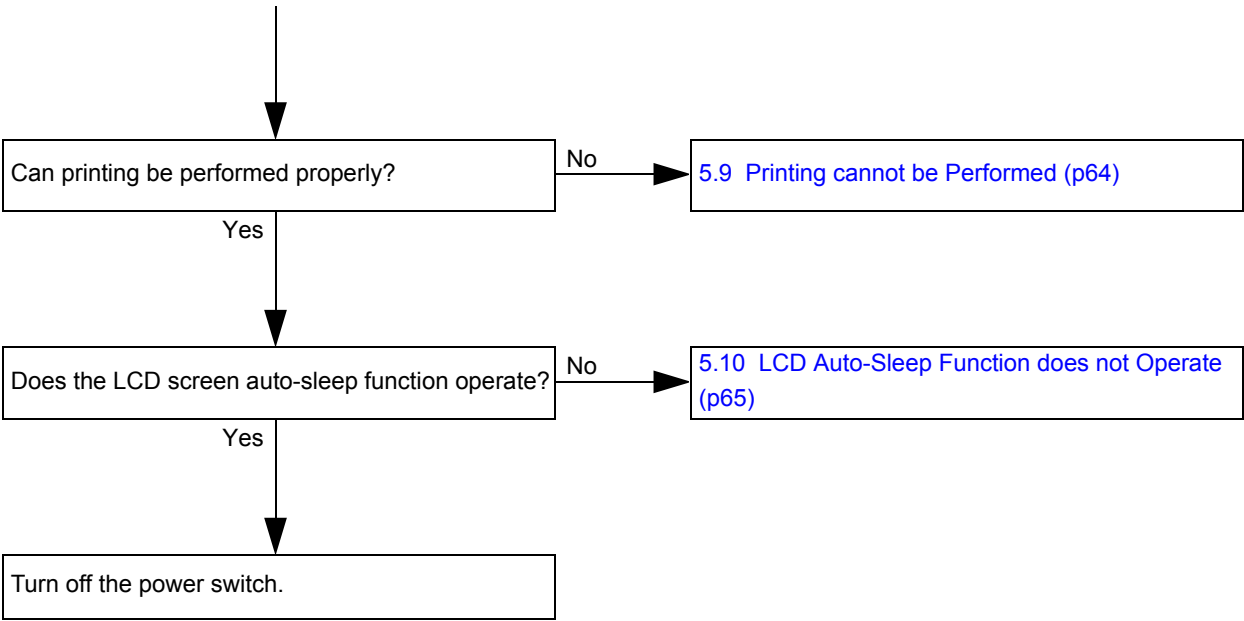
3.4 Others

- | | |
|---------------------------|---|
| 1 . Installation category | II (Overvoltage category) |
| 2 . Pollution degree | 2 (IEC60664) |
| 3 . Service life | 8 years from the date of initial operation (certified)
Proper maintenance, check, and replacement of consumable parts are necessary. |
| 4 . Packaging unit | 1 unit |
- Specifications and appearance are subject to change for improvement without notice.

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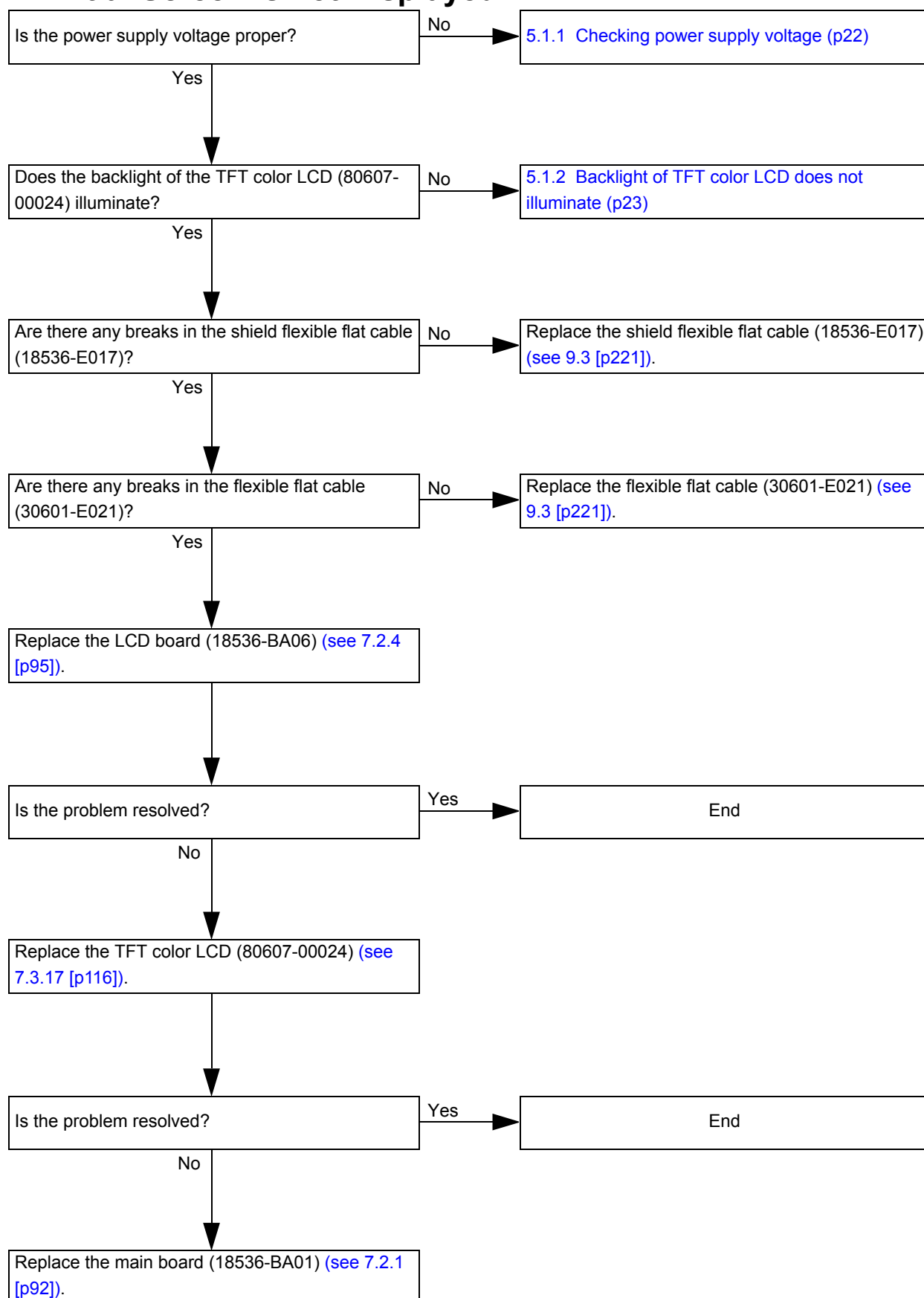
4 TROUBLESHOOTING



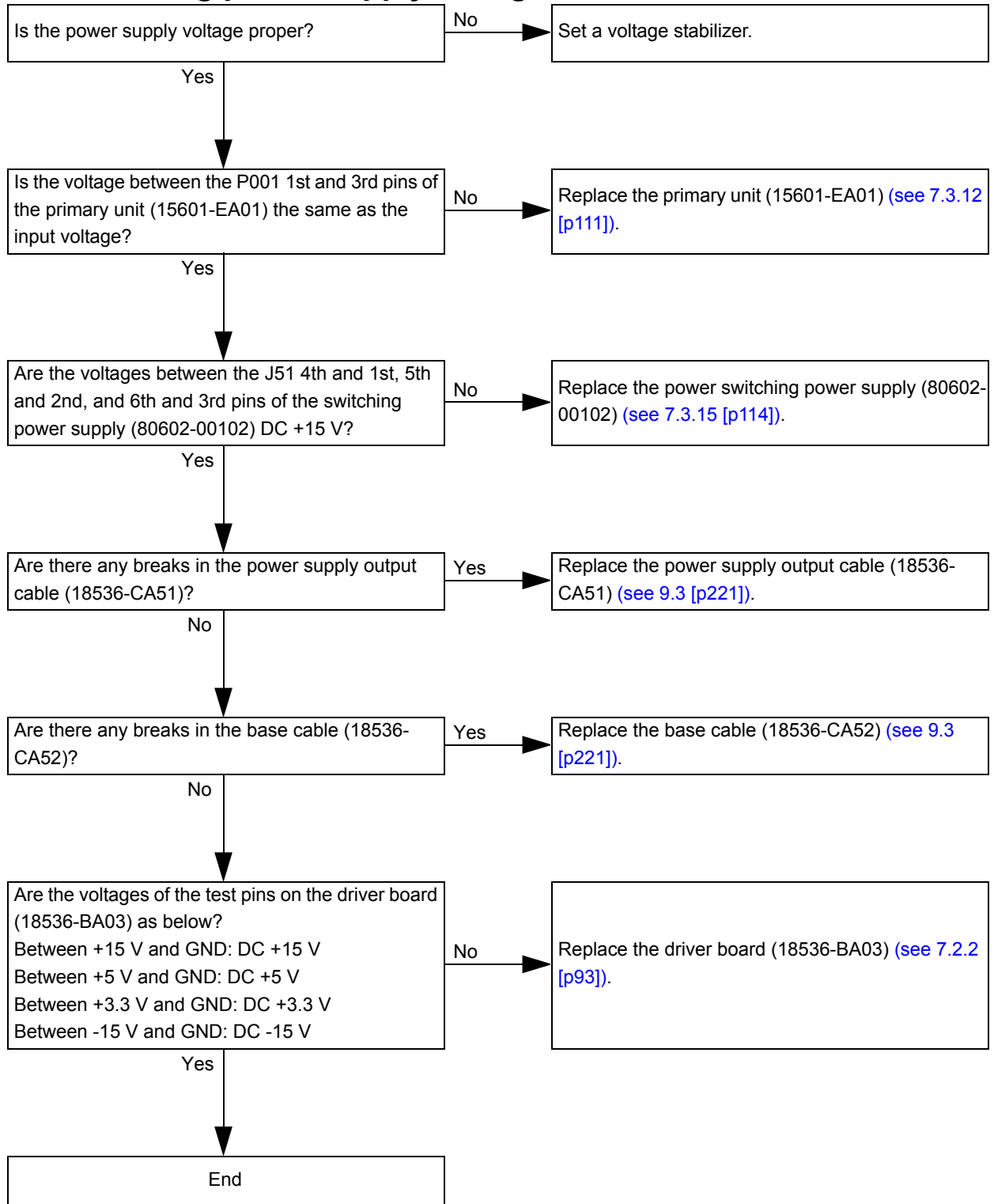


5 SUBTROUBLESHOOTING

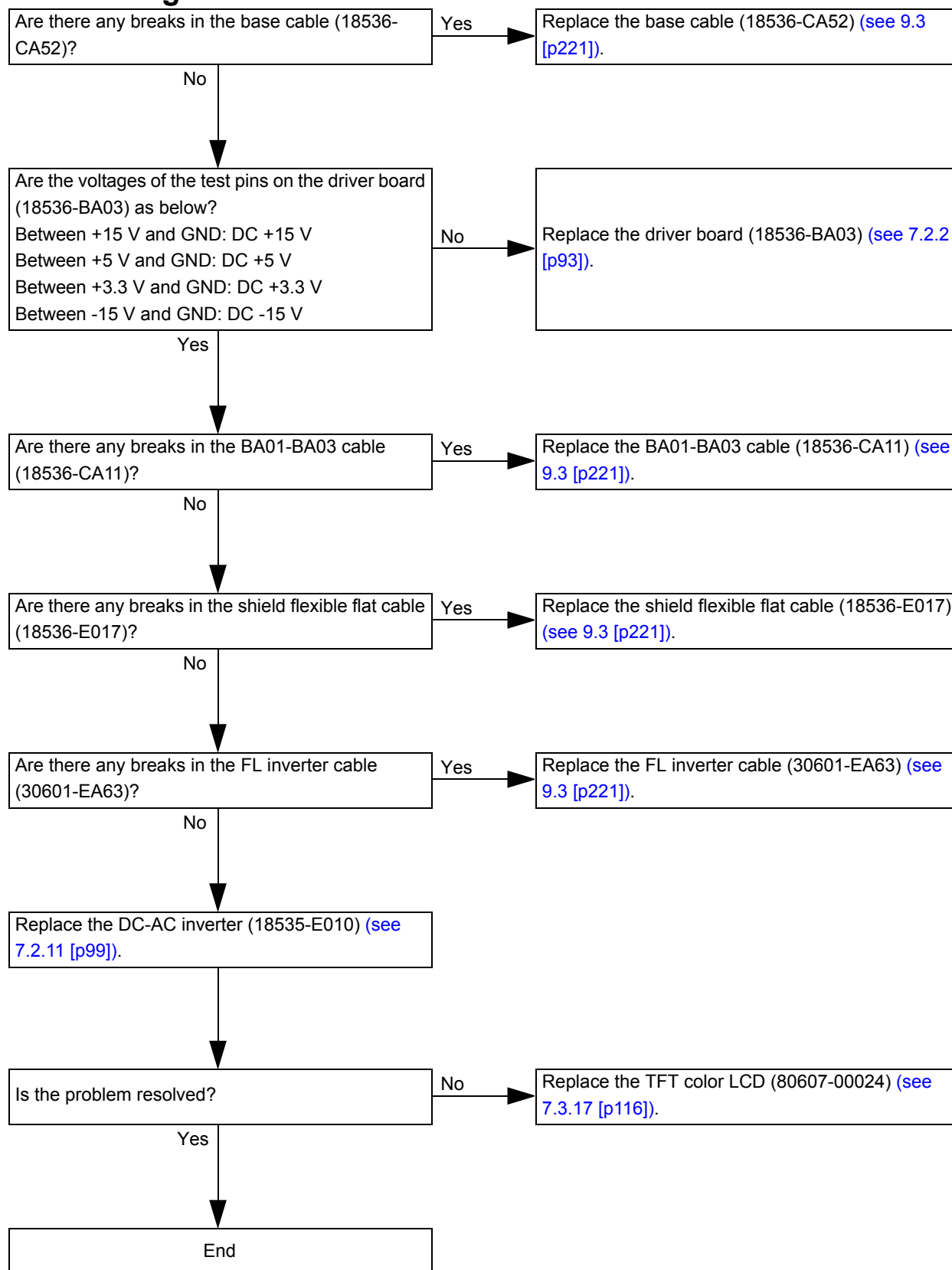
5.1 Initial Screen is not Displayed



5.1.1 Checking power supply voltage

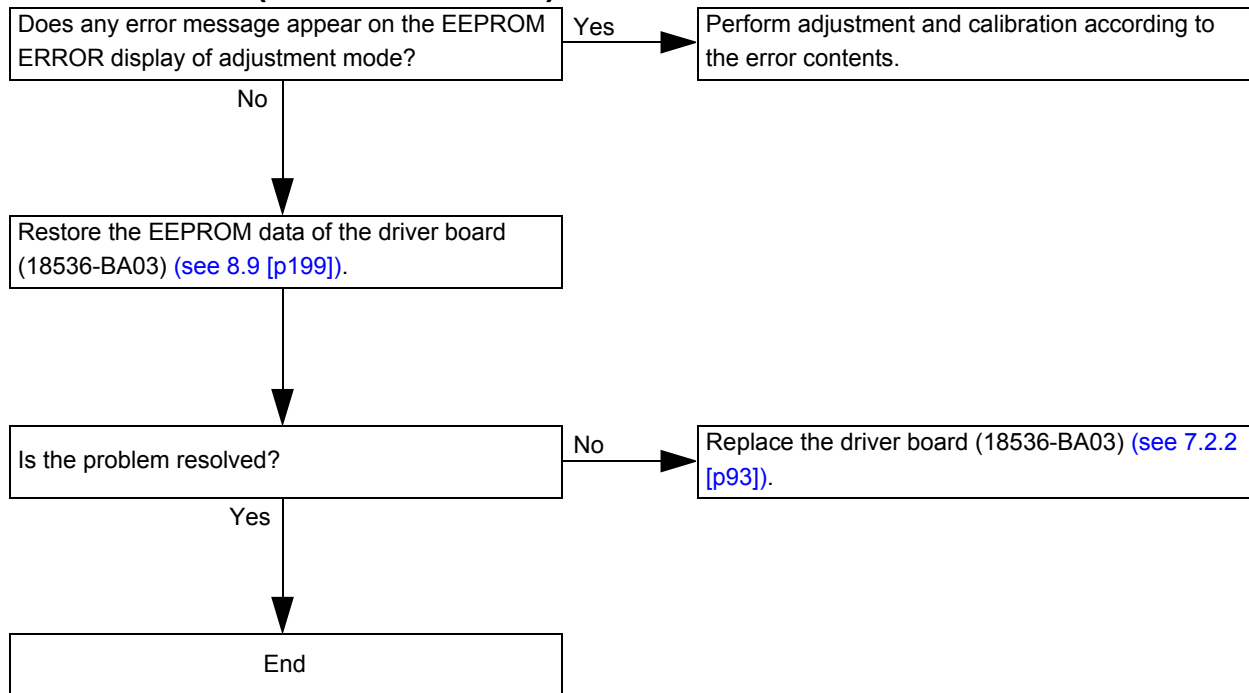


5.1.2 Backlight of TFT color LCD does not illuminate

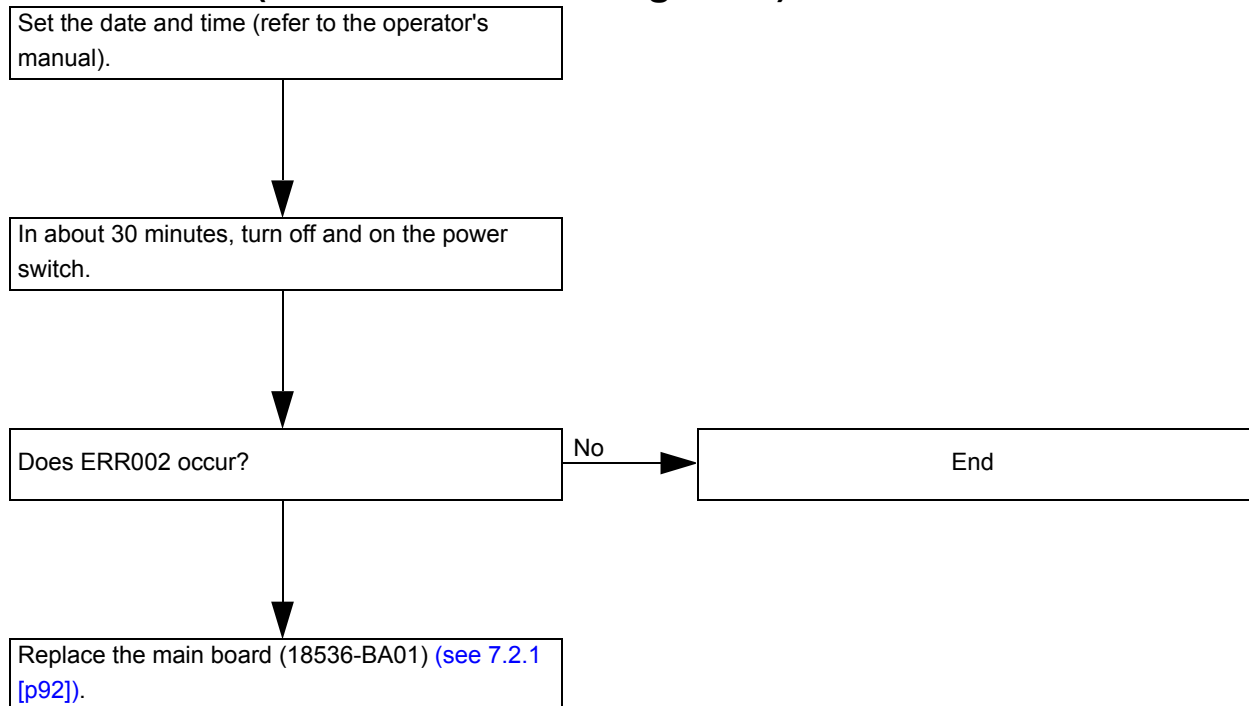


5.2 Error Message Appears

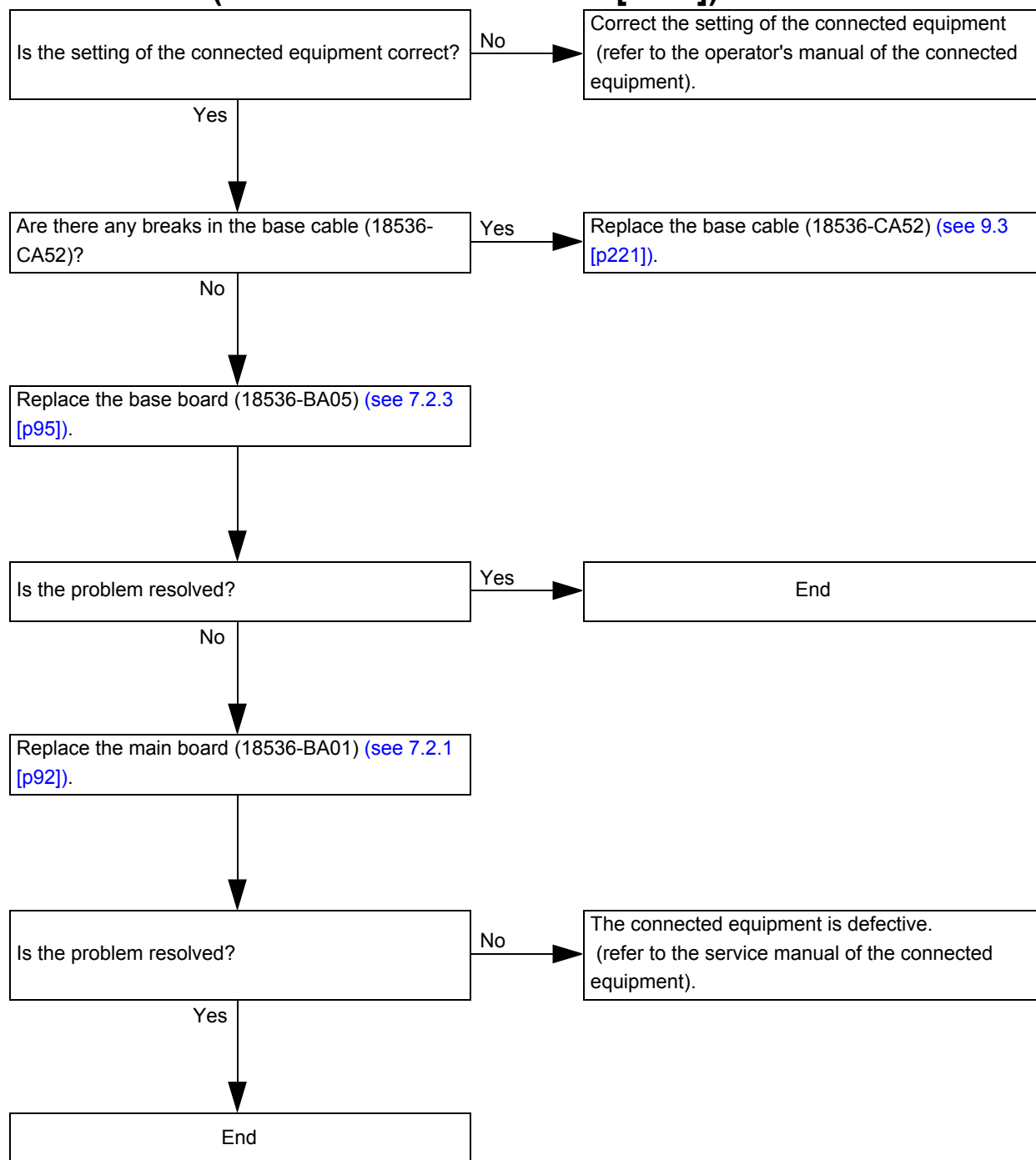
5.2.1 ERR001 (EEPROM error)



5.2.2 ERR002 (Date and time setting error)



5.2.3 ERR011 (Character time-out error [OUT])



5.2.4 ERR012 (Reception start time-out [OUT])

Perform the procedure as in [5.2.3 ERR011 \(Character time-out error \[OUT\]\)](#) (p25).

5.2.5 ERR013 (Reception error [OUT])

Perform the procedure as in [5.2.3 ERR011 \(Character time-out error \[OUT\]\)](#) (p25).

5.2.6 ERR014 (Reception code error [OUT])

Perform the procedure as in [5.2.3 ERR011 \(Character time-out error \[OUT\]\)](#) (p25).

5.2.7 ERR015 (Reply time-out [OUT])

Perform the procedure as in [5.2.3 ERR011 \(Character time-out error \[OUT\]\)](#) (p25).

5.2.8 ERR016 (DTR-DSR error [OUT])

Perform the procedure as in [5.2.3 ERR011 \(Character time-out error \[OUT\]\)](#) (p25).

5.2.9 ERR017 (Data error [OUT])

Perform the procedure as in [5.2.3 ERR011 \(Character time-out error \[OUT\]\)](#) (p25).

5.2.10 ERR018 (Command error [OUT])

Perform the procedure as in [5.2.3 ERR011 \(Character time-out error \[OUT\]\)](#) (p25).

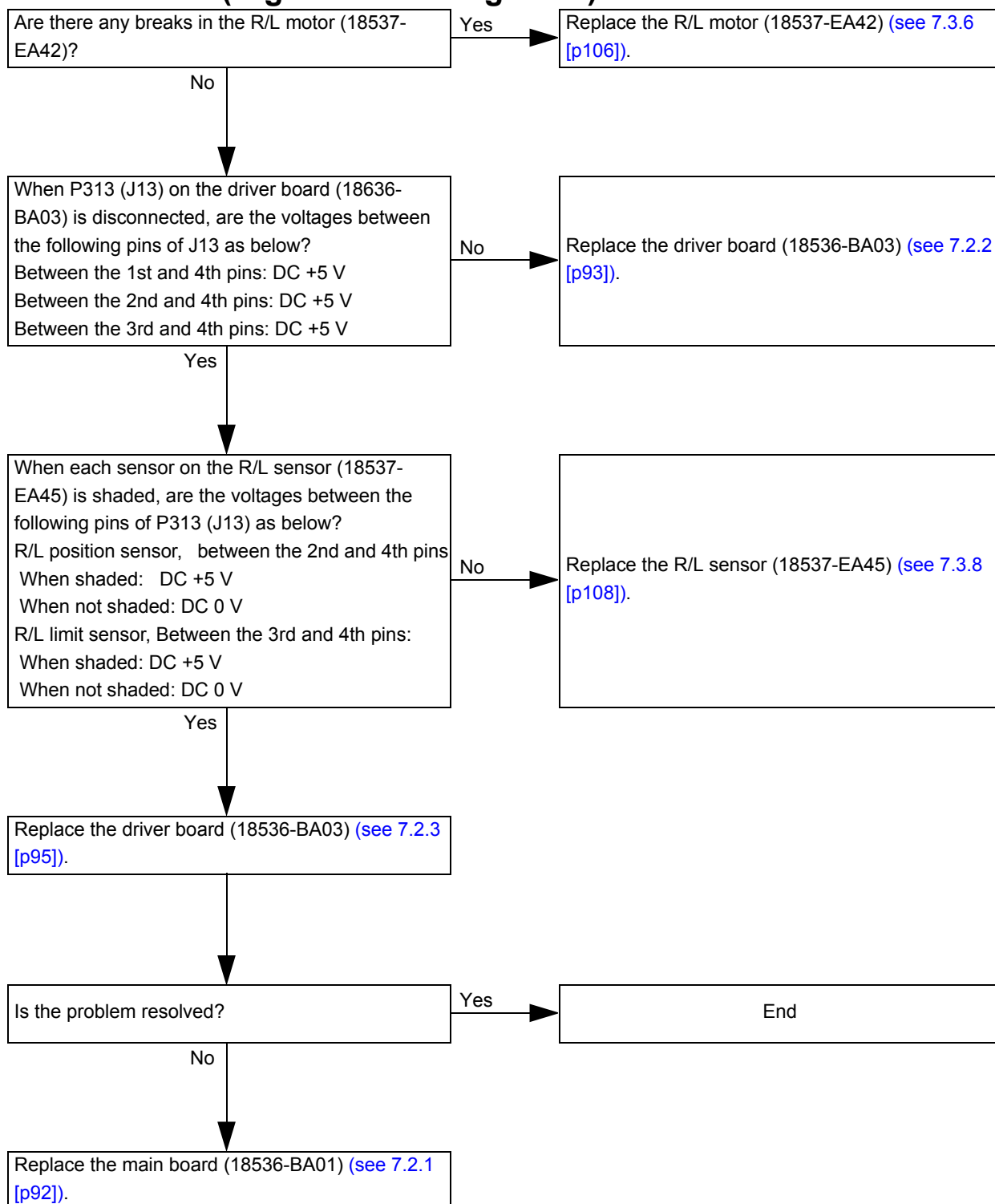
5.2.11 NO DAT

Perform measurement to confirm that the measurement data is displayed.

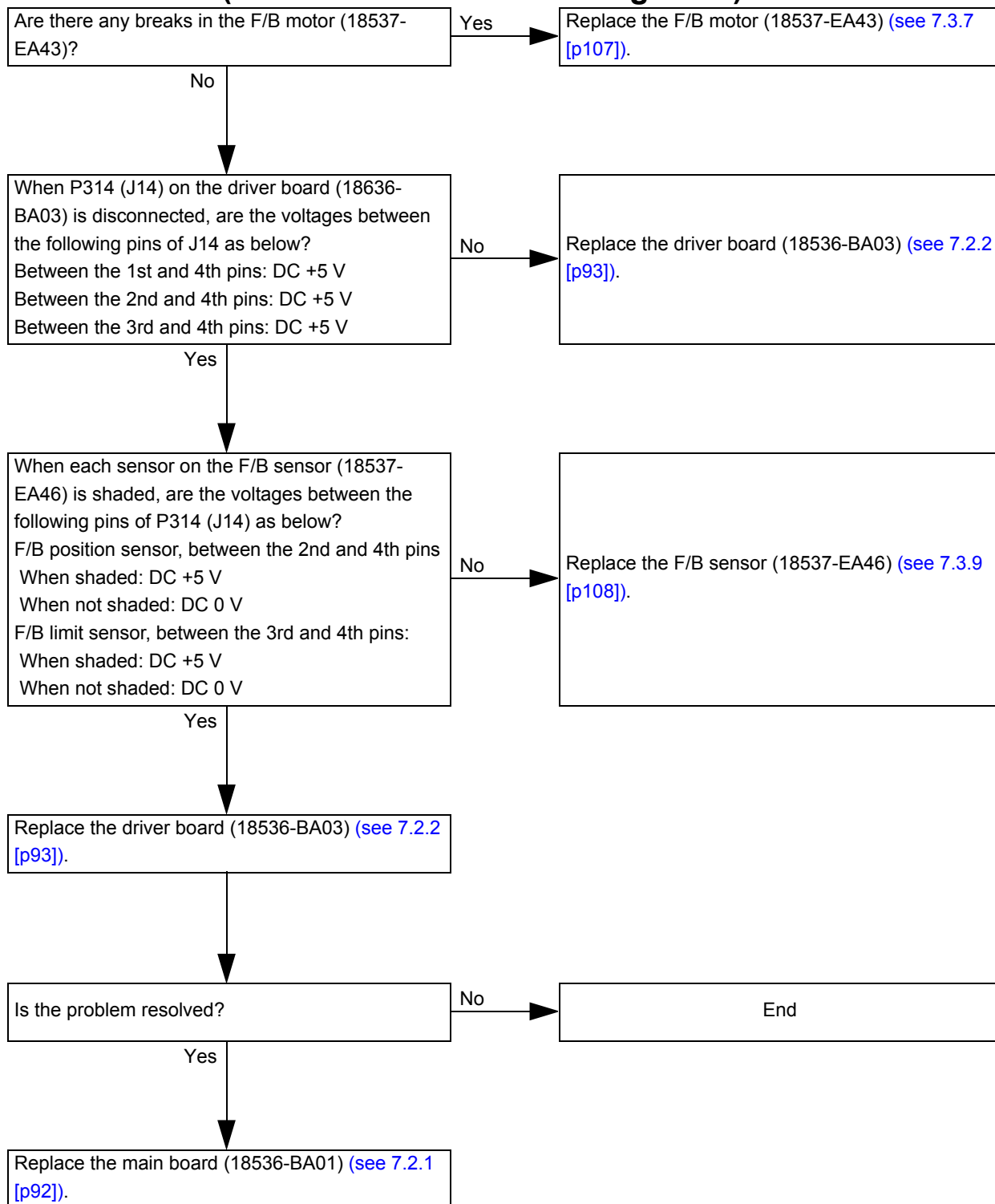
5.2.12 ERR031 (Up/down tracking error)

Perform the procedure as in [5.5 Rotating Joystick does not Move Measuring Unit Up or Down](#) (p42).

5.2.13 ERR032 (Right/left tracking error)



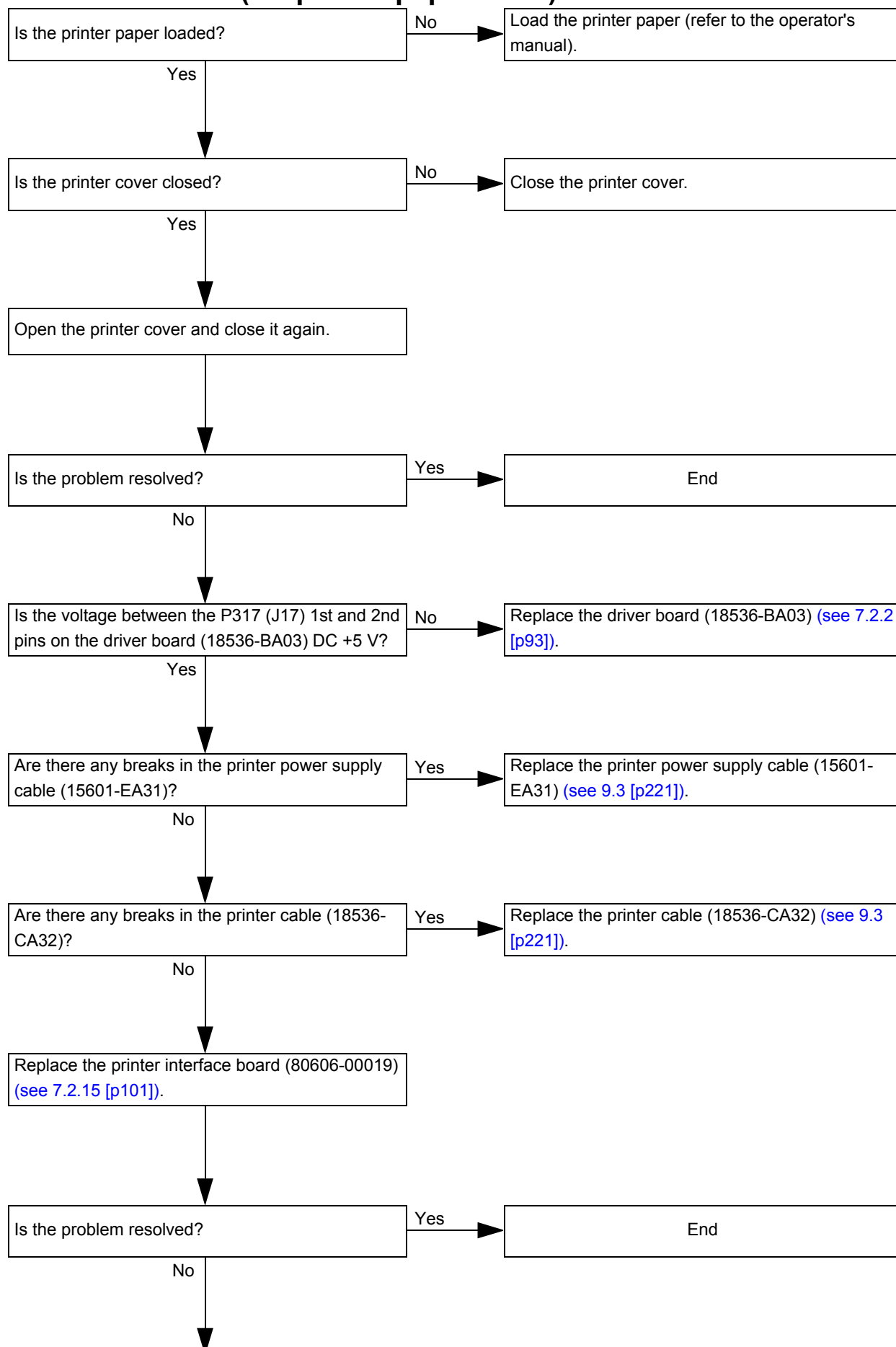
5.2.14 ERR033 (Forward/backward tracking error)

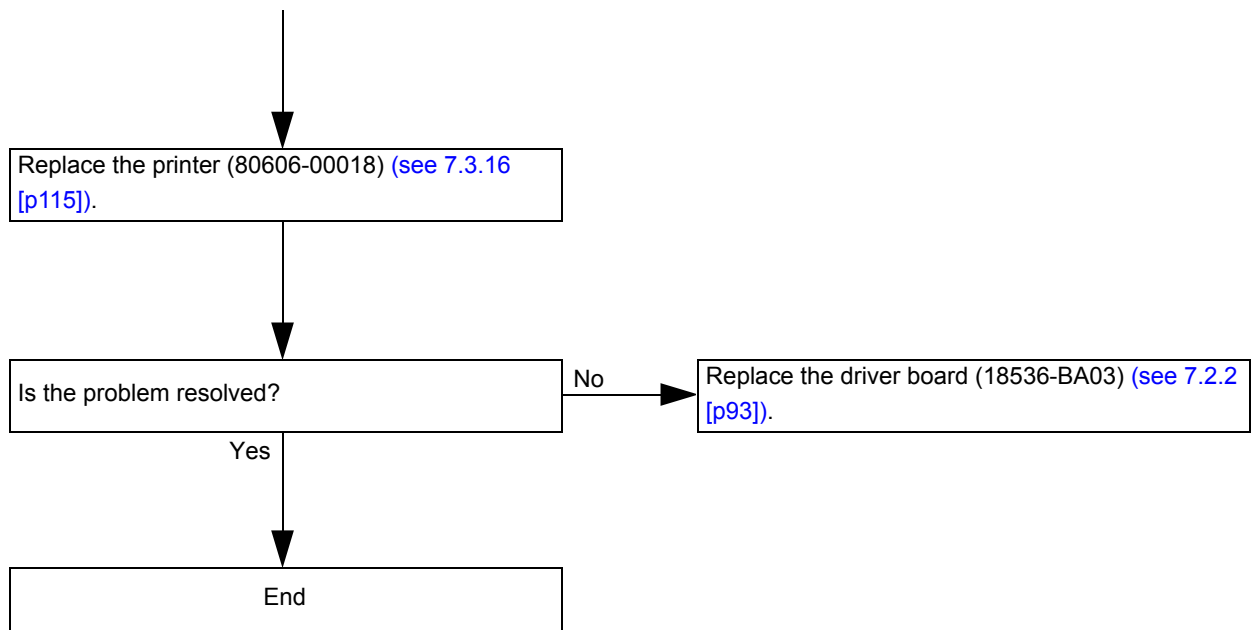


5.2.15 ERR034 (Chinrest up/down movement error)

Perform the procedure as in [5.6 Chinrest does not Move \(p44\)](#).

5.2.16 NO PAPER (No printer paper error)

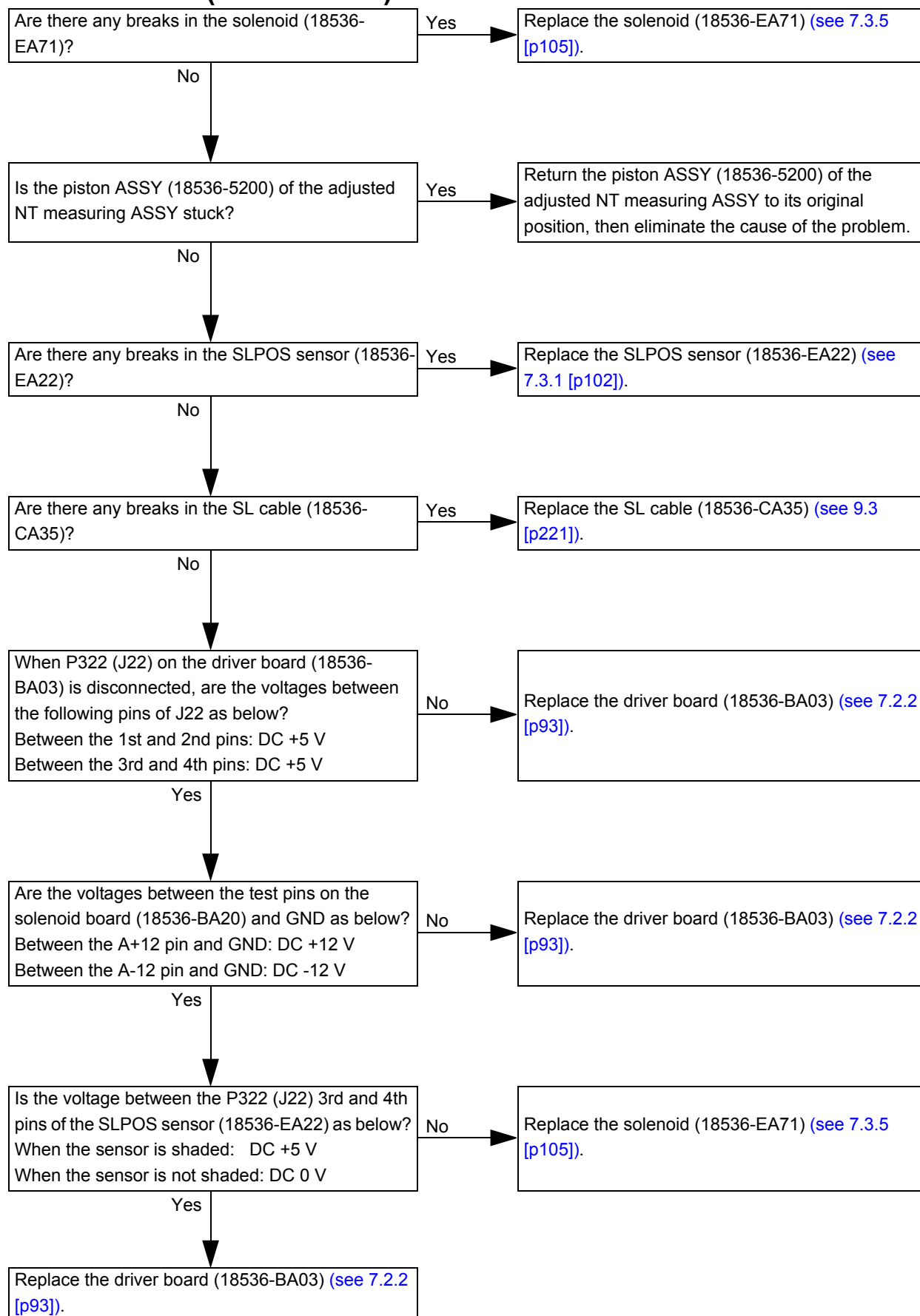




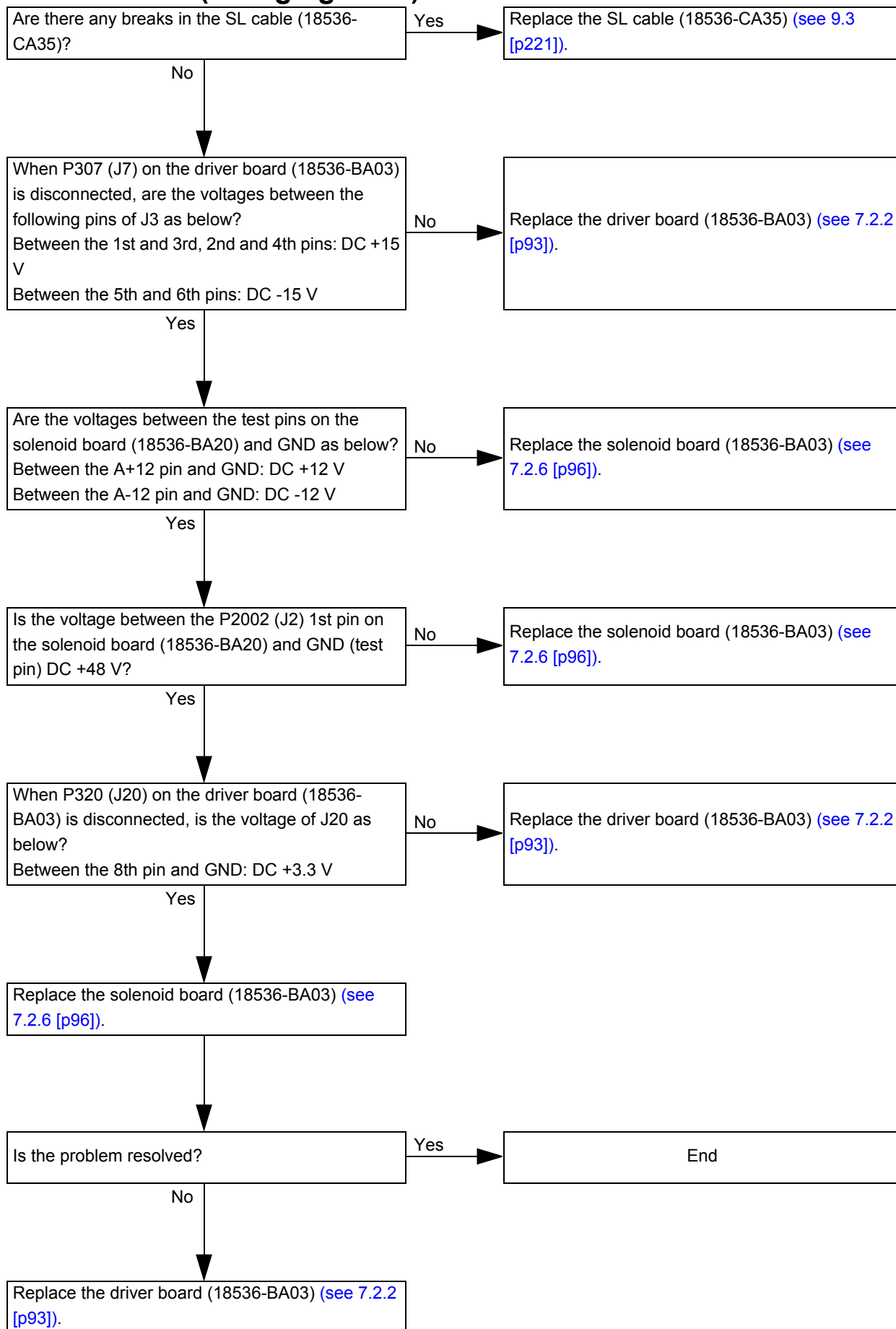
5.2.17 ERR044 (Printer hardware error)

Replace the printer (80606-00018) (see 7.3.16 [p115]).

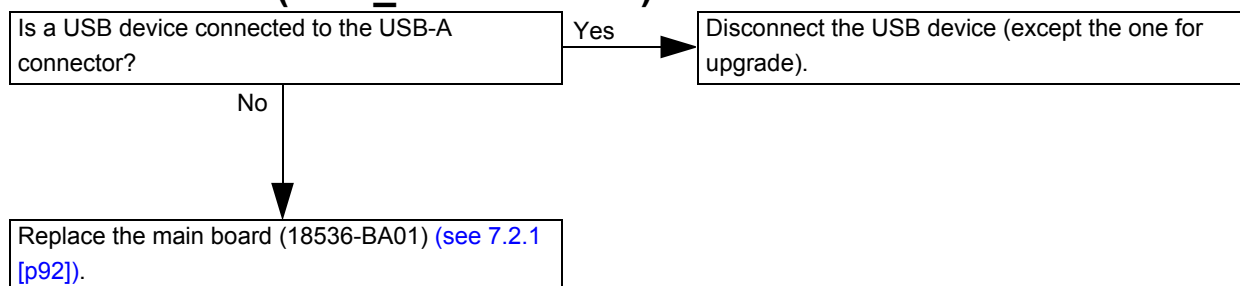
5.2.18 ERR201 (Piston error)



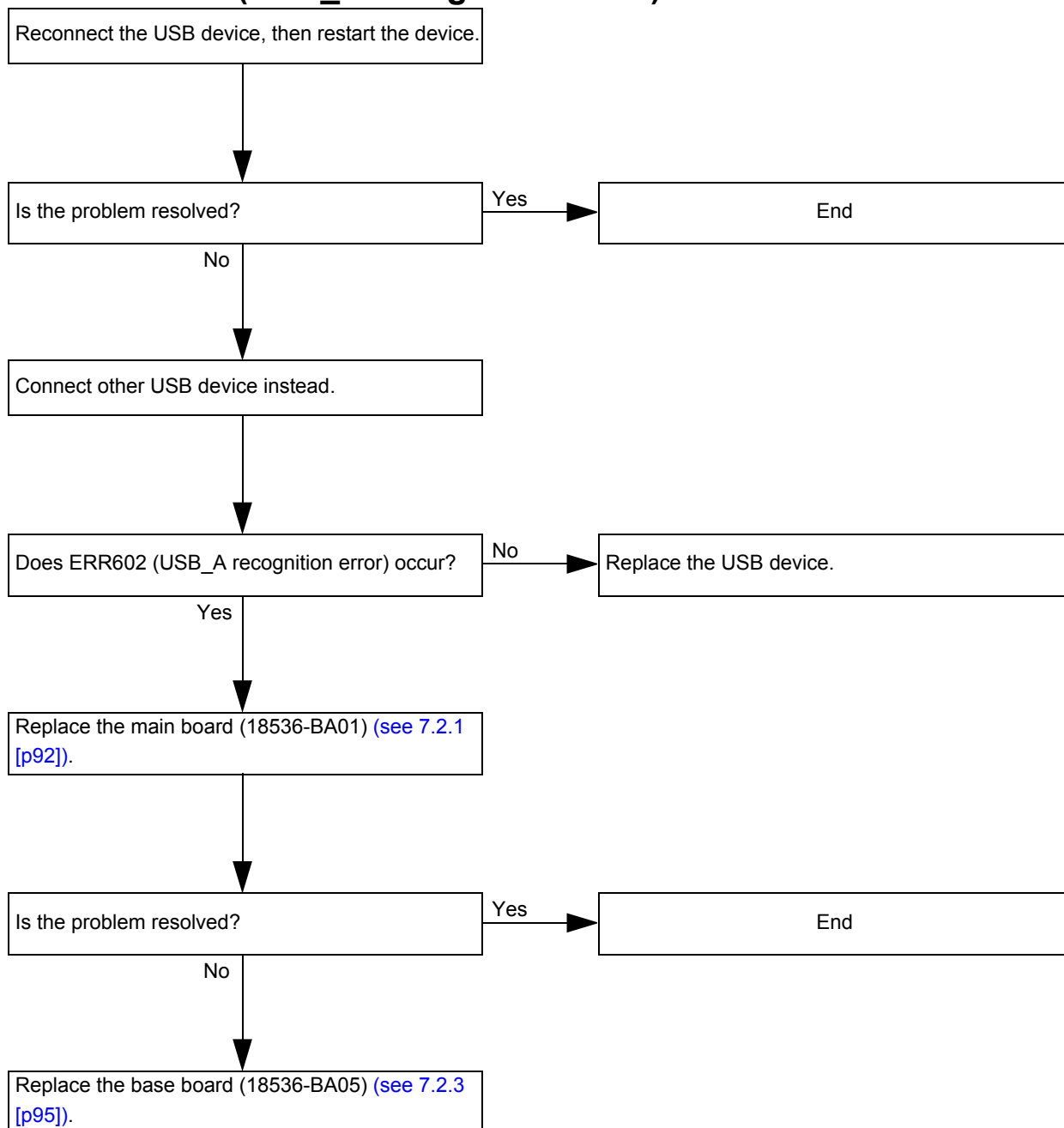
5.2.19 ERR202 (Charging error)



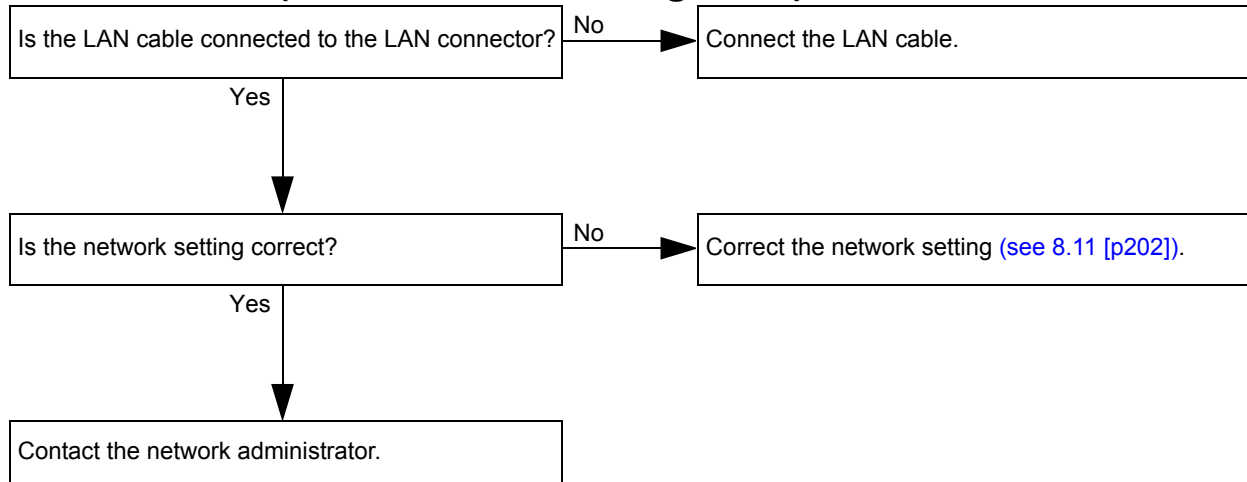
5.2.20 ERR601 (USB_A class error)



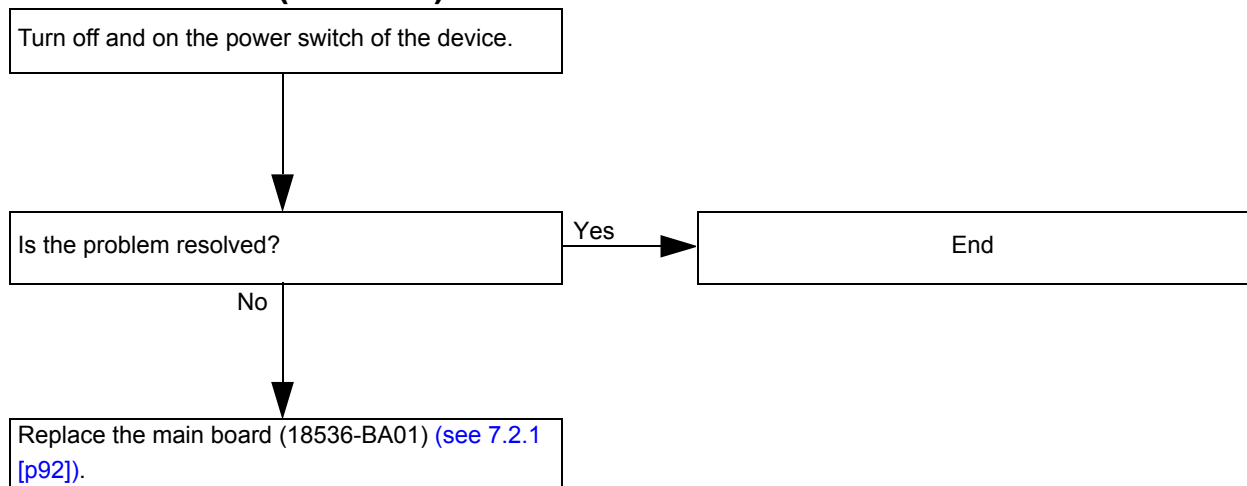
5.2.21 ERR602 (USB_A recognition error)



5.2.22 ERR700 (Windows file sharing error)



5.2.23 ERR703 (IC error)



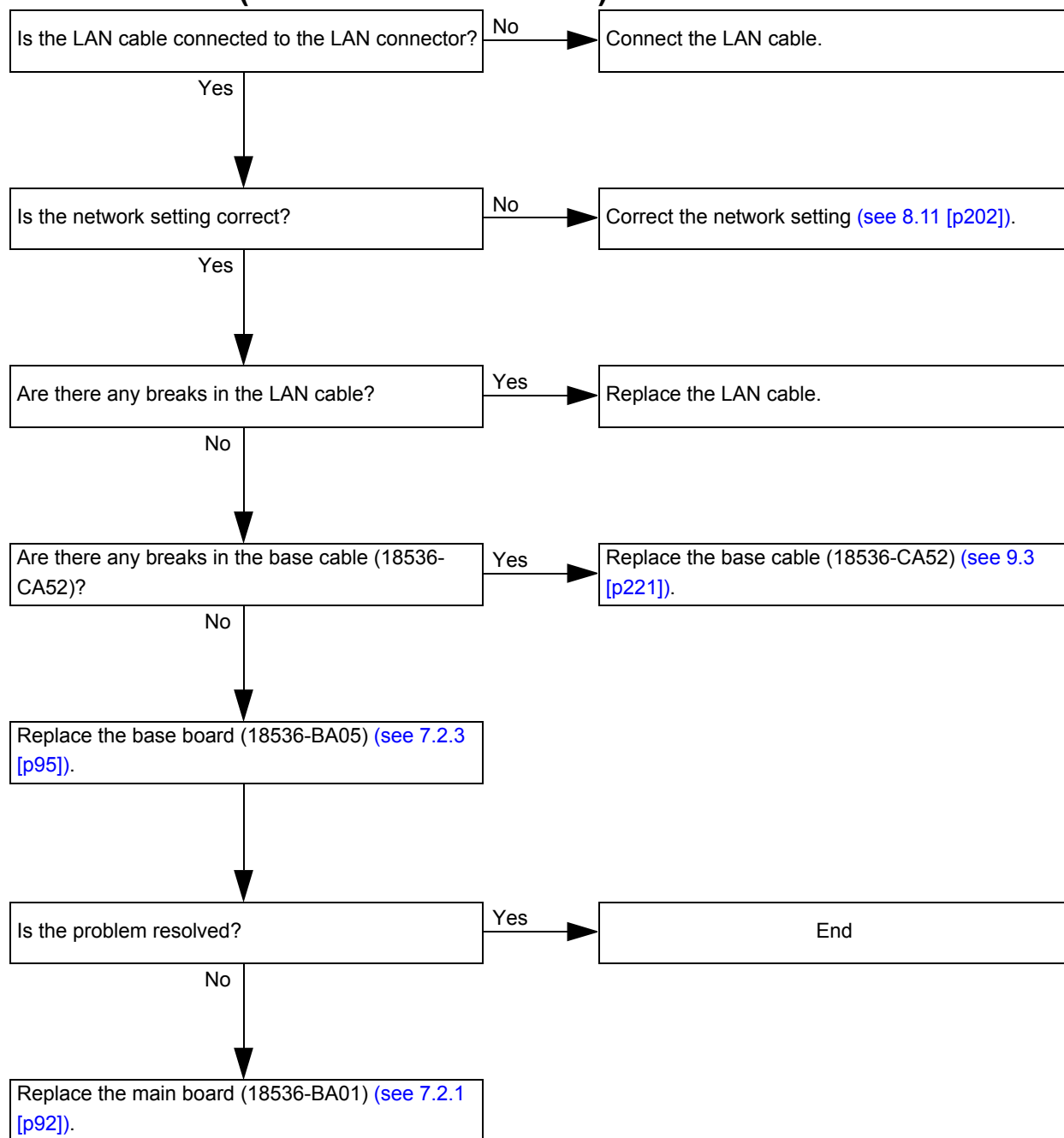
5.2.24 ERR704 (DHCP error)

The IP address cannot be obtained.

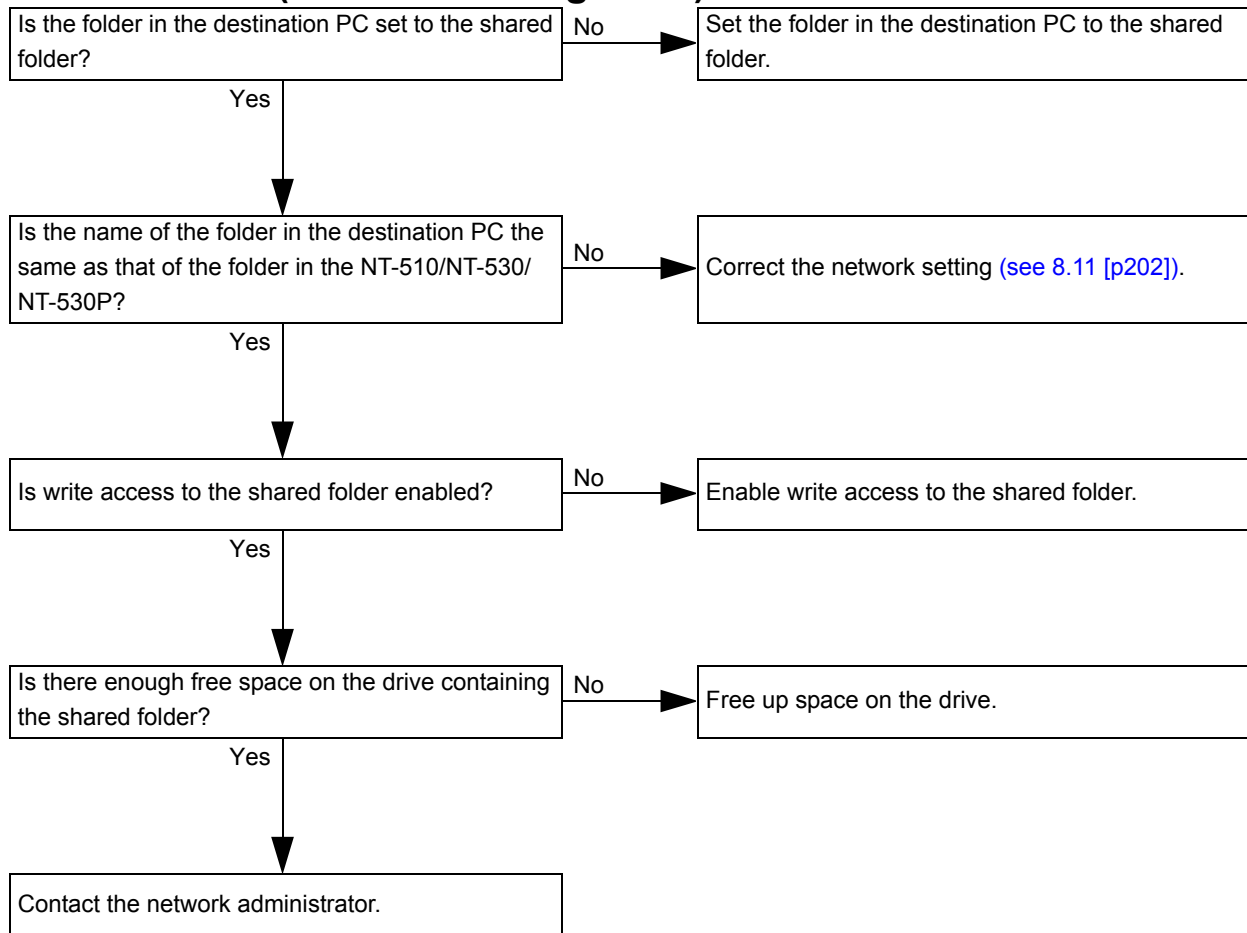
As the DHCP server may not operate normally, contact the network administrator.

Or, set the DHCP connection to OFF and set the IP address and subnet mask (see 8.11 [p202]).

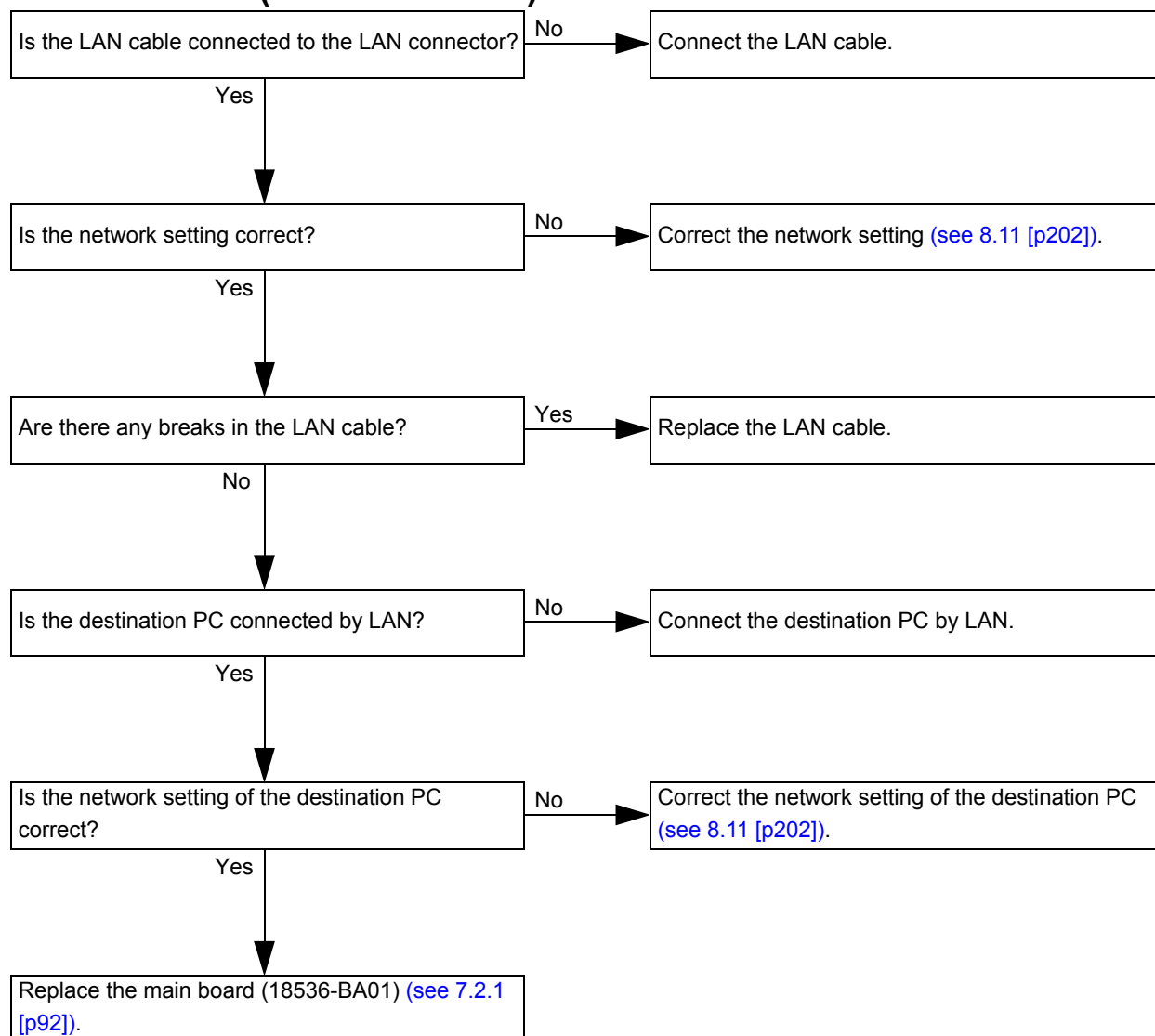
5.2.25 ERR750 (Network access error)



5.2.26 ERR751 (Network writing error)



5.2.27 ERR754 (PC name error)

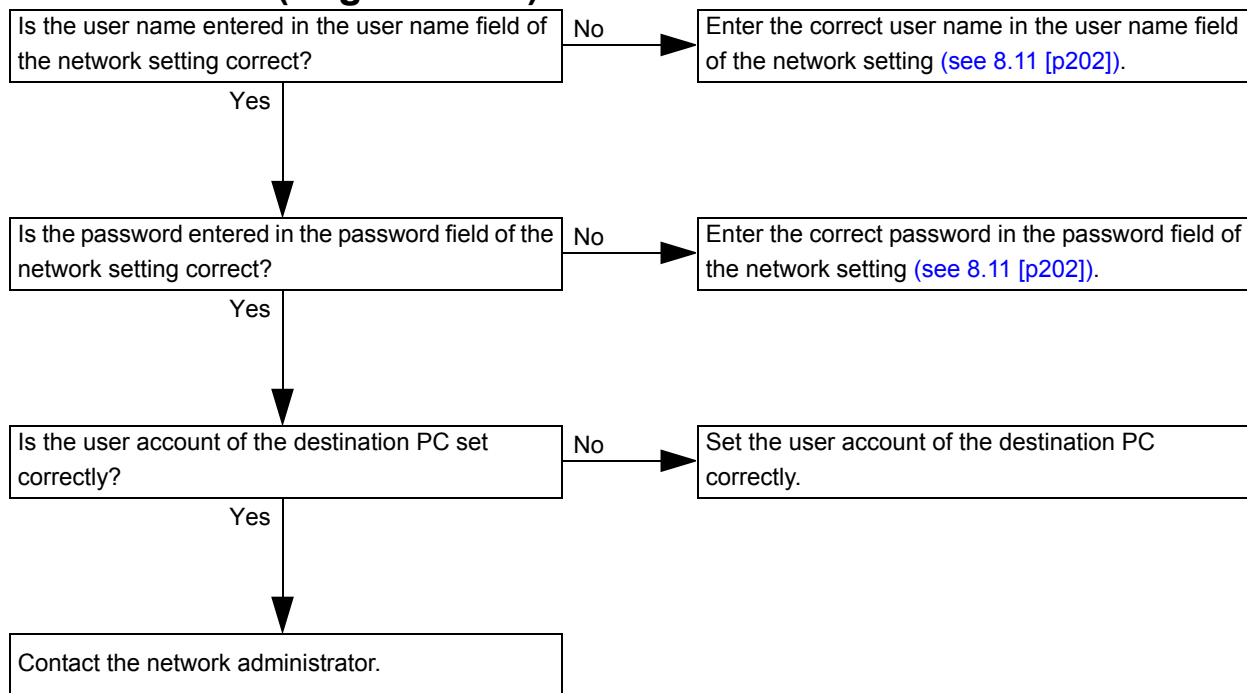


5.2.28 ERR755 (Read-only folder error)

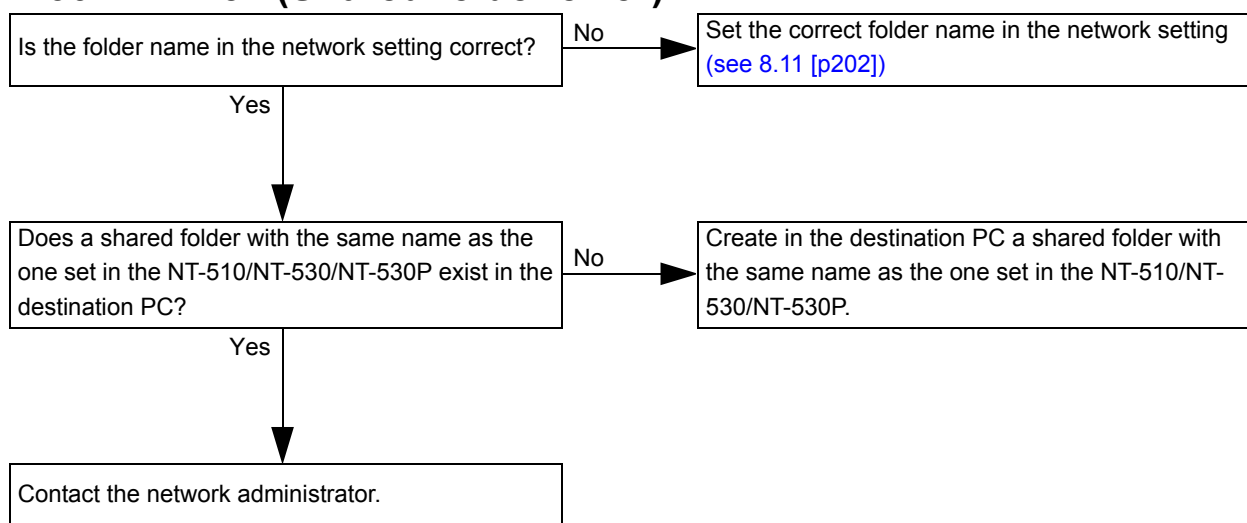
The shared folder in the destination PC is write-protected.

Disable write protection of the shared folder in the destination PC.

5.2.29 ERR756 (Log on error)



5.2.30 ERR757 (Shared folder error)



5.2.31 ERR758 (Time-out error)

Wait for some time then try again.

5.2.32 ERR759 (Deletion error)

The shared folder in the destination PC is write-protected.

Disable write protection of the shared folder in the destination PC.

5.2.33 ERR760 (Initialization error)

- 1 . Wait for some time then try again.
- 2 . If the problem is not resolved after several tries, replace the main board (30611-BA01) ([see 7.2.1 \[p92\]](#)).

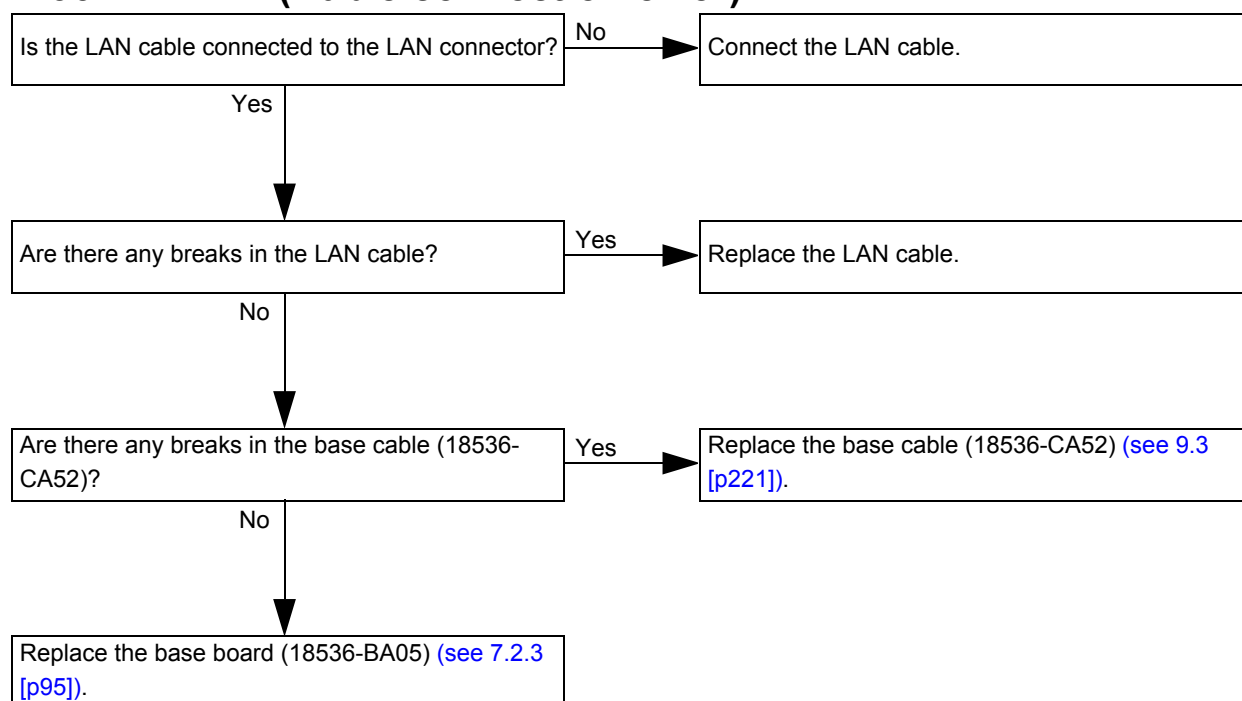
5.2.34 ERR761 (Access right error)

Perform the procedure as in [5.2.29 ERR756 \(Log on error\) \(p38\)](#).

5.2.35 ERR762 (Account error)

Perform the procedure as in [5.2.29 ERR756 \(Log on error\) \(p38\)](#).

5.2.36 ERR771 (Cable connection error)

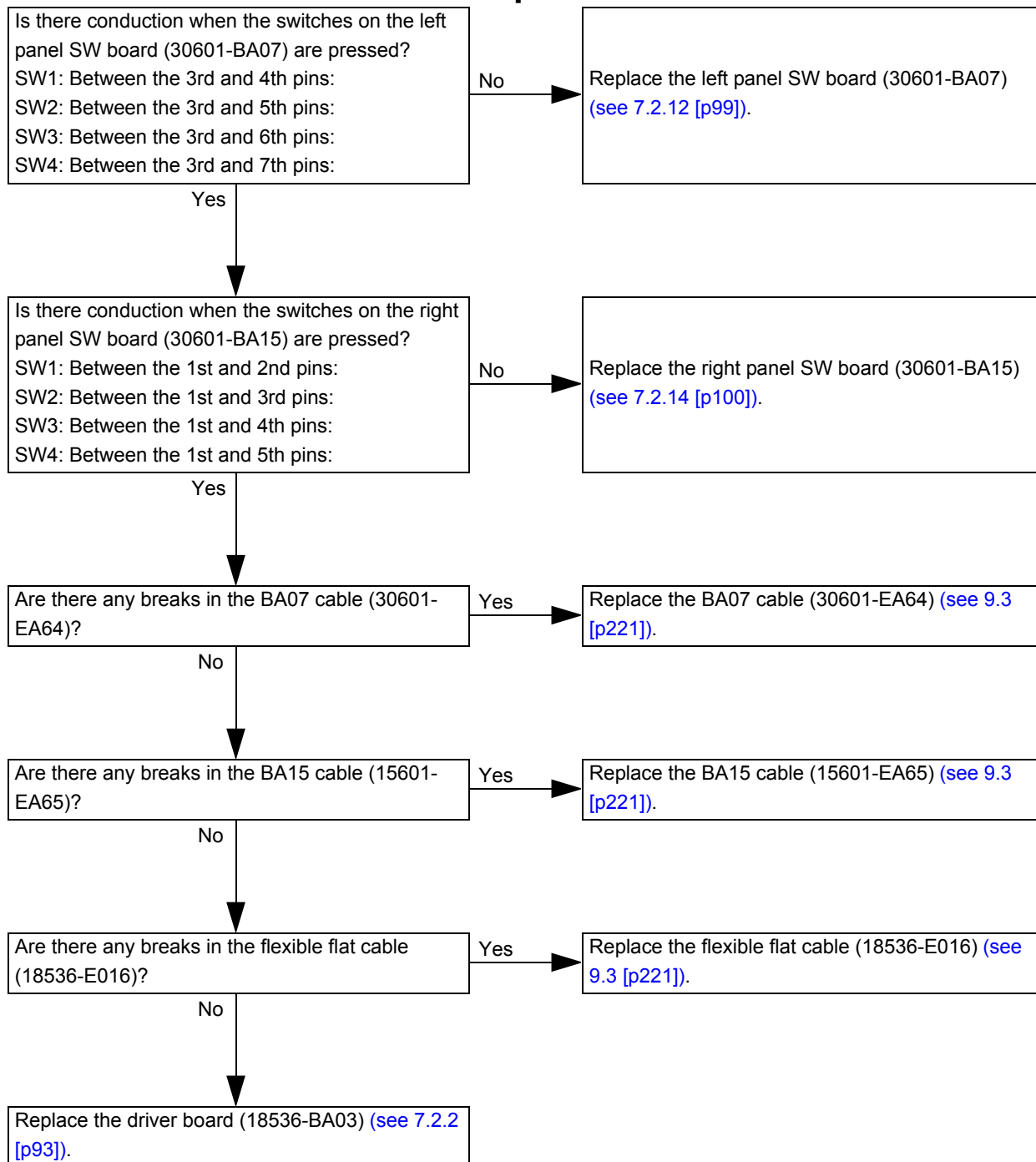


5.2.37 ERR772 (Response error)

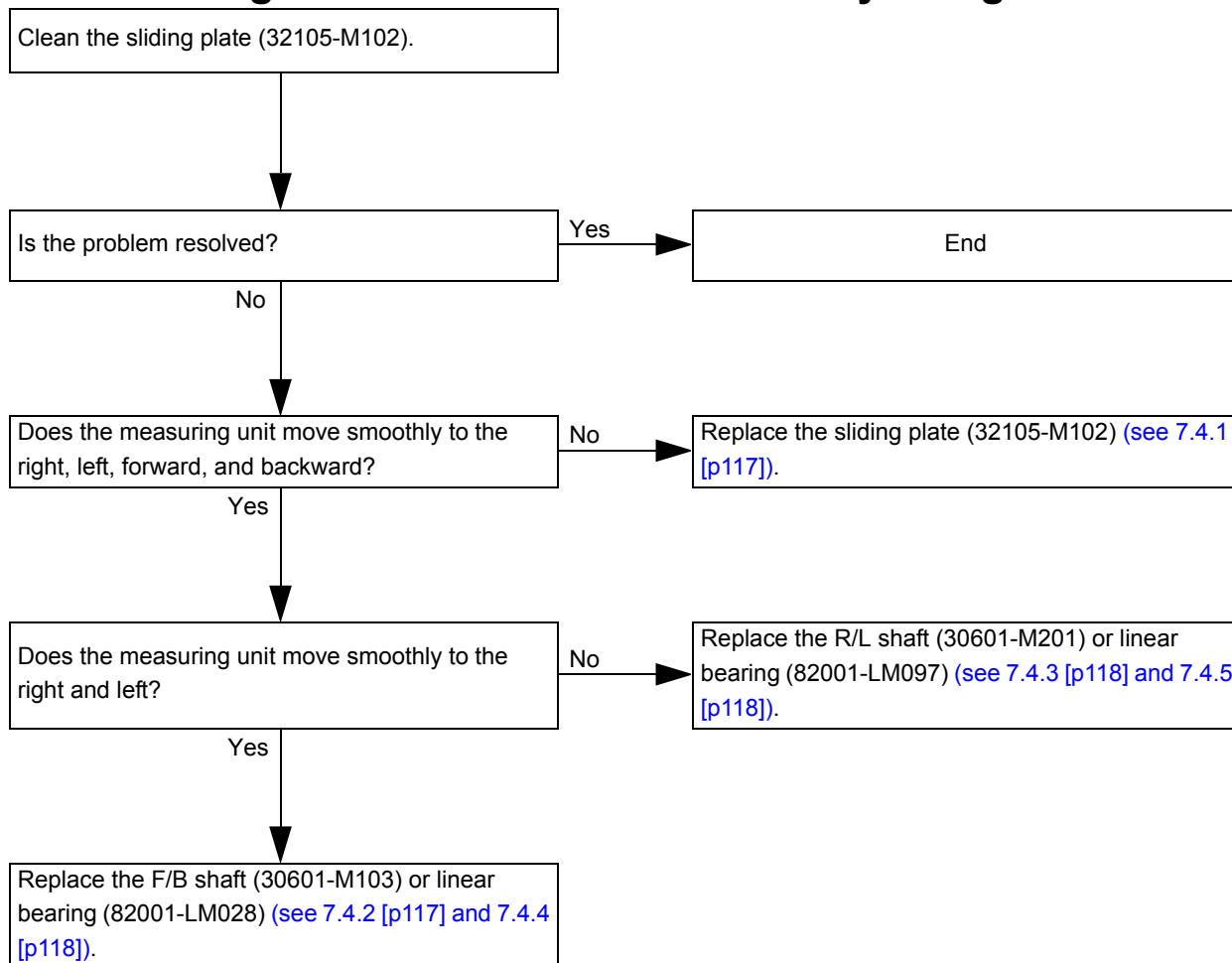
The data reception software (NAVIS) in the PC could not delete the data within the time frame (5 seconds after data reception).

Check the setting of the data reception software (NAVIS) in the PC.

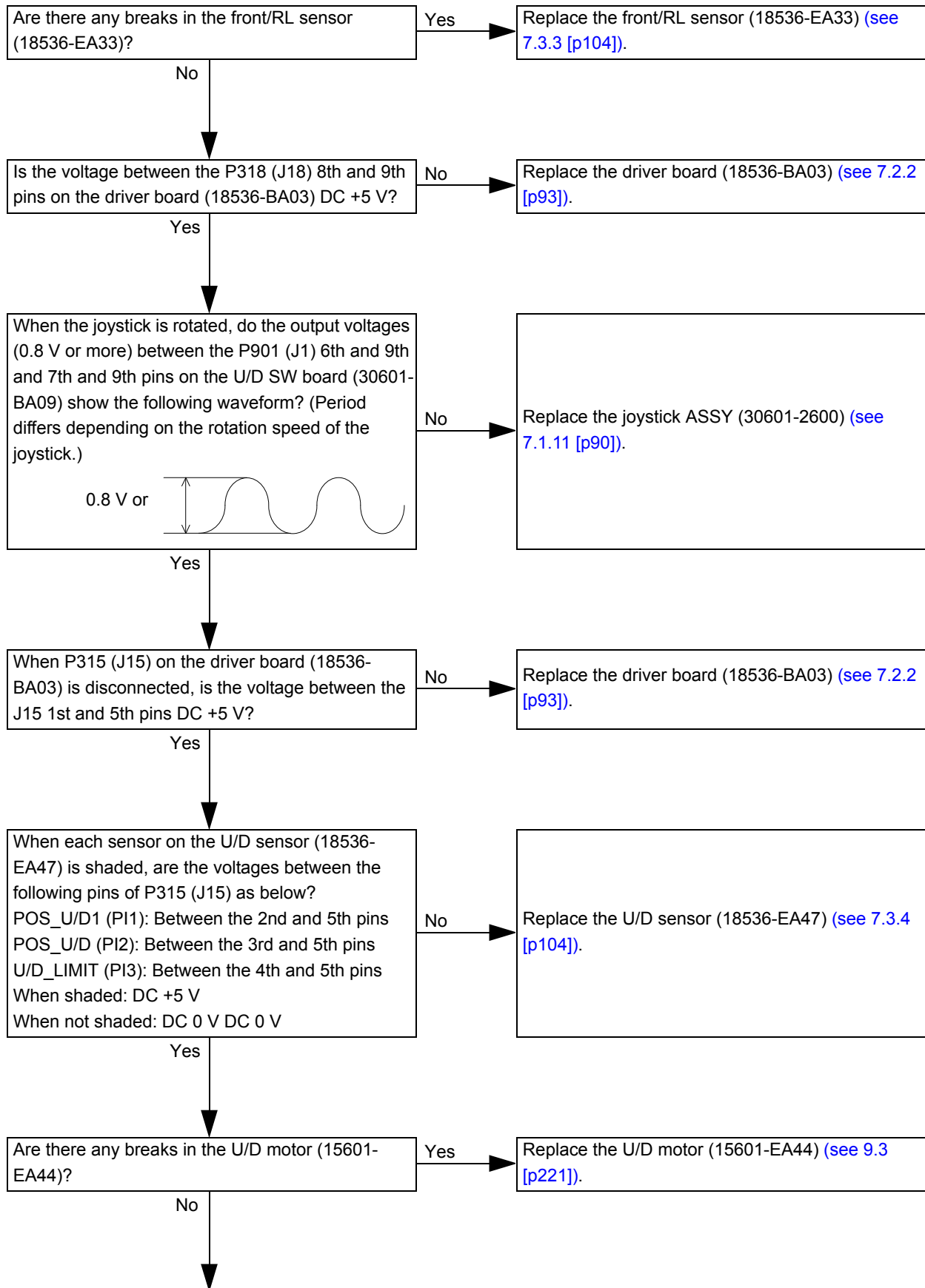
5.3 Function Buttons are not Operational

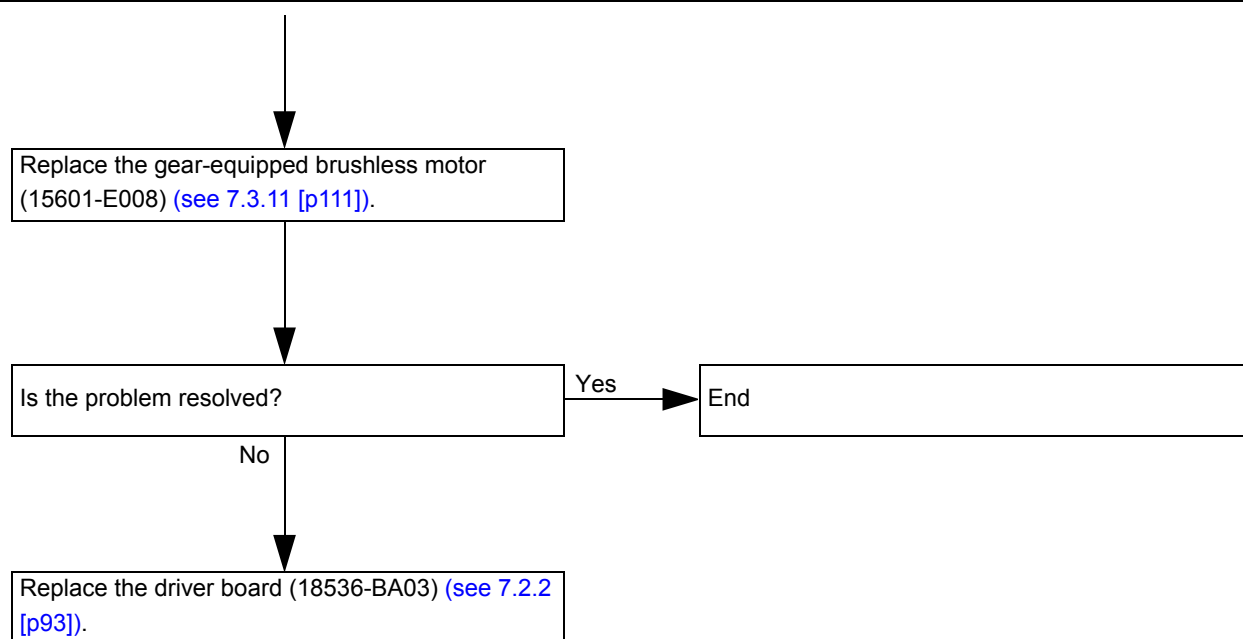


5.4 Measuring Unit does not Move Smoothly along Base Unit

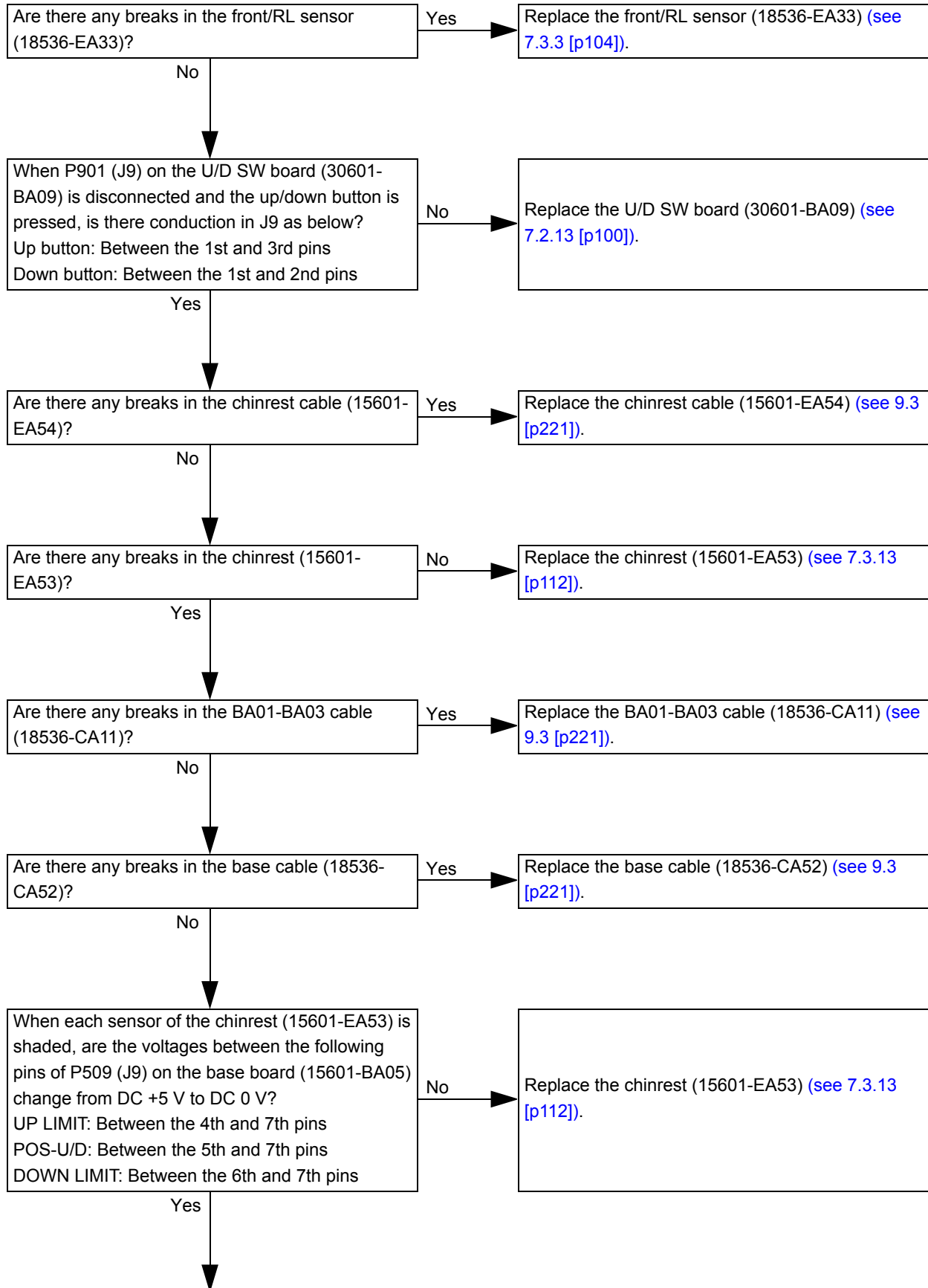


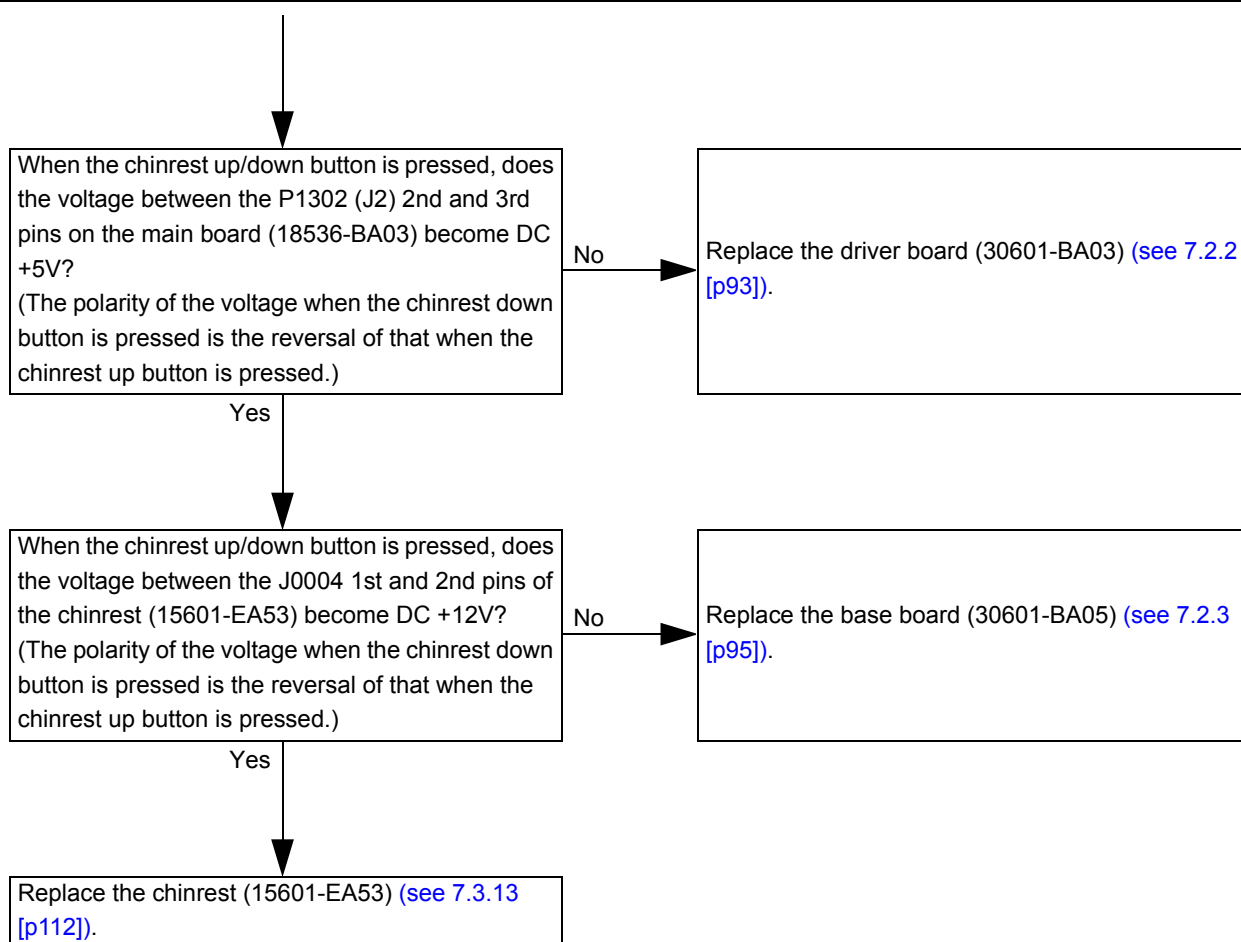
5.5 Rotating Joystick does not Move Measuring Unit Up or Down



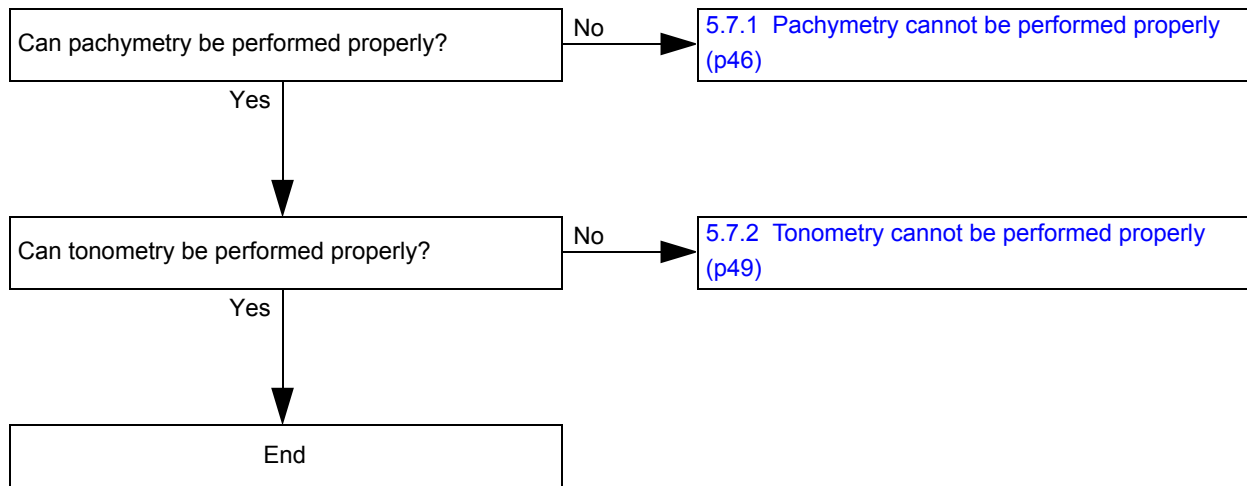


5.6 Chinrest does not Move

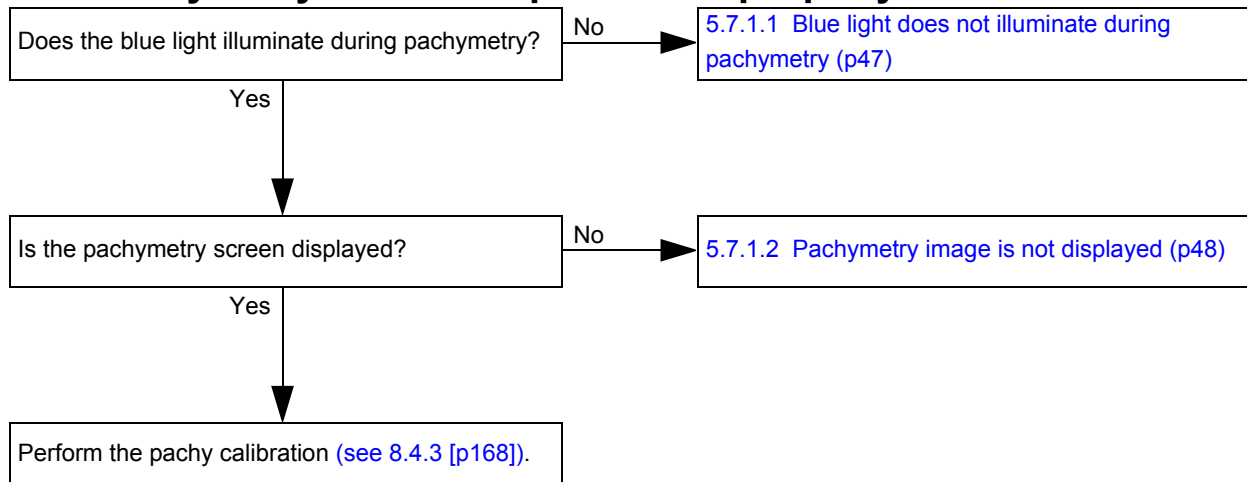




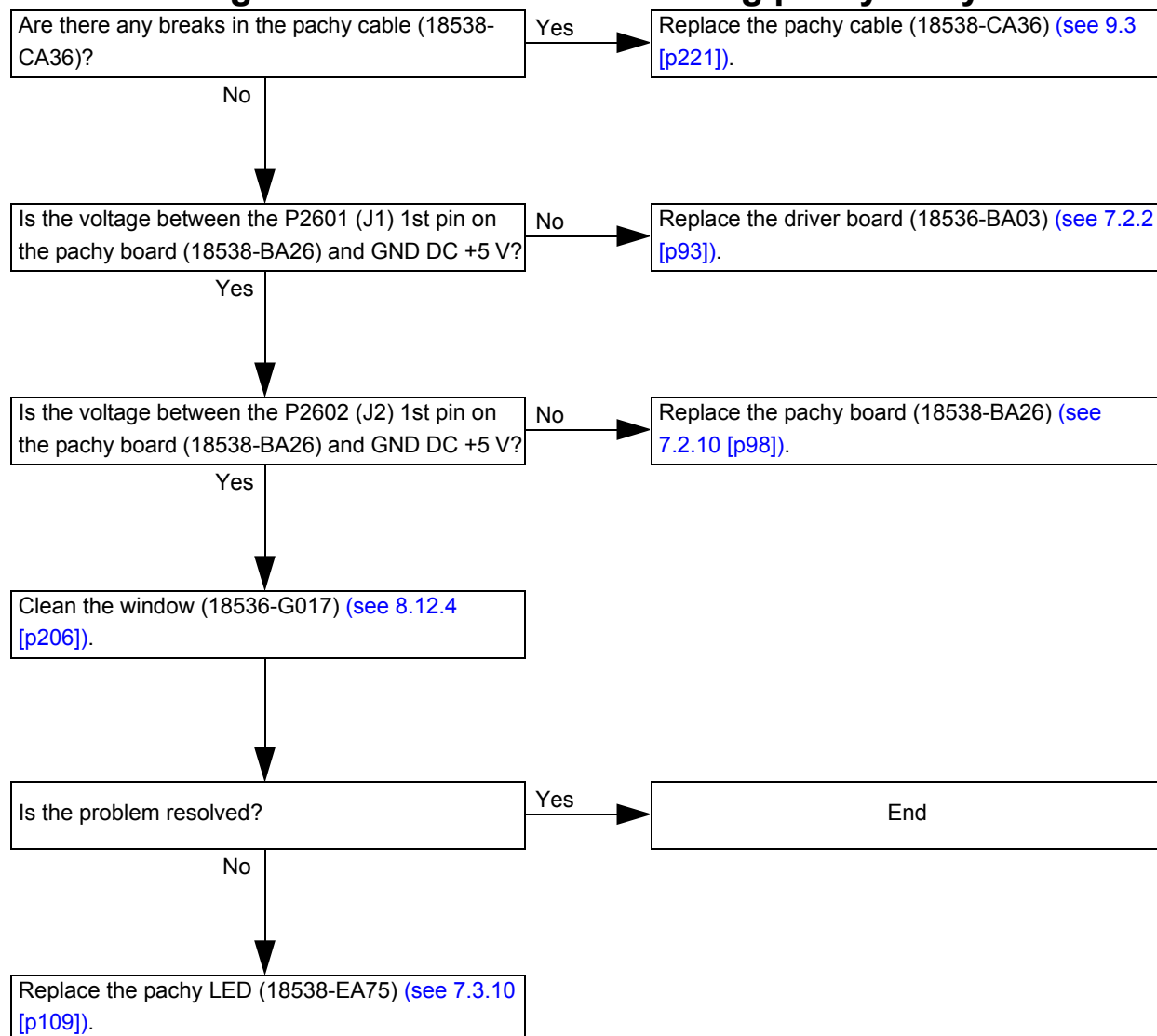
5.7 Measurement cannot be Performed Properly



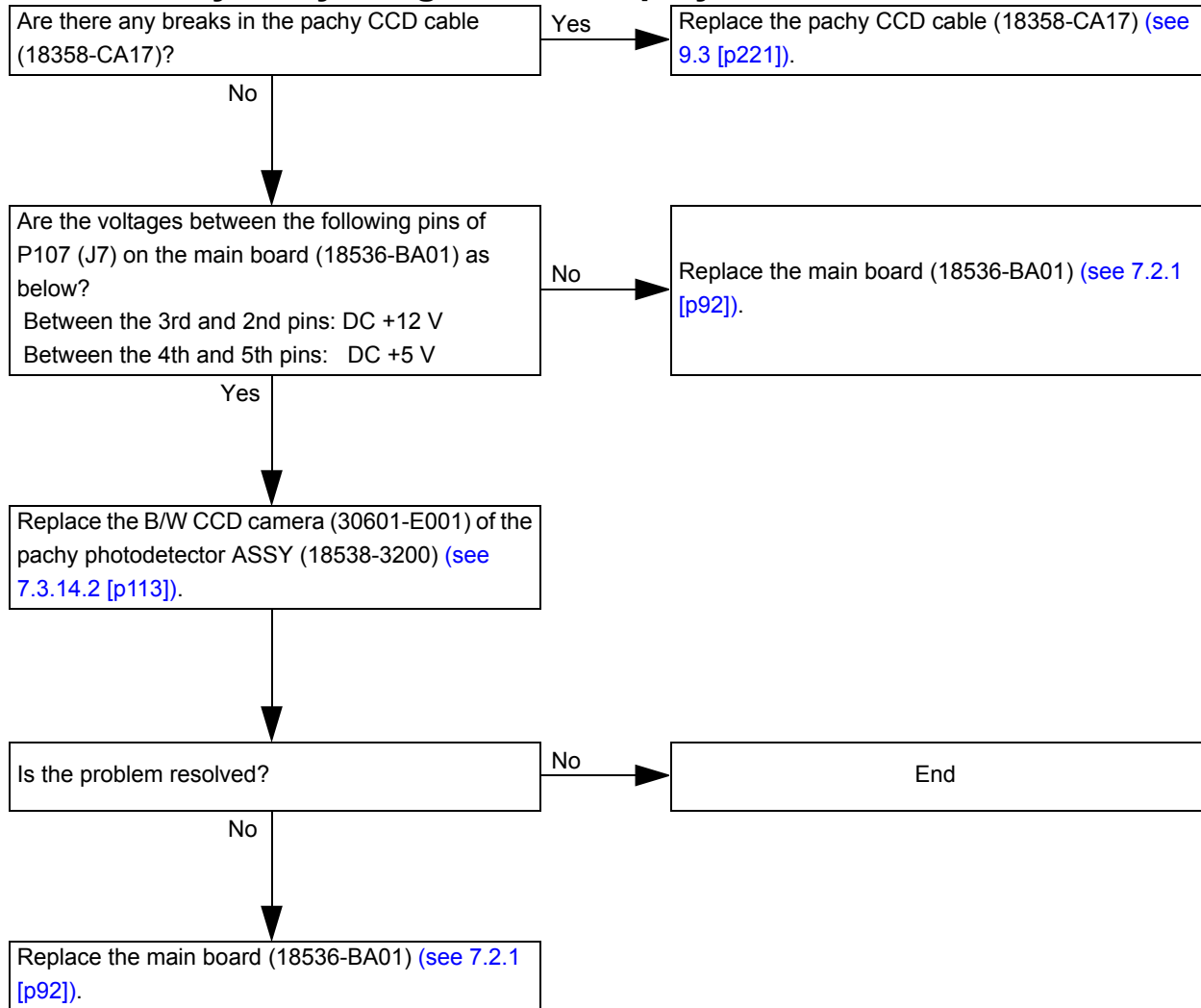
5.7.1 Pachymetry cannot be performed properly



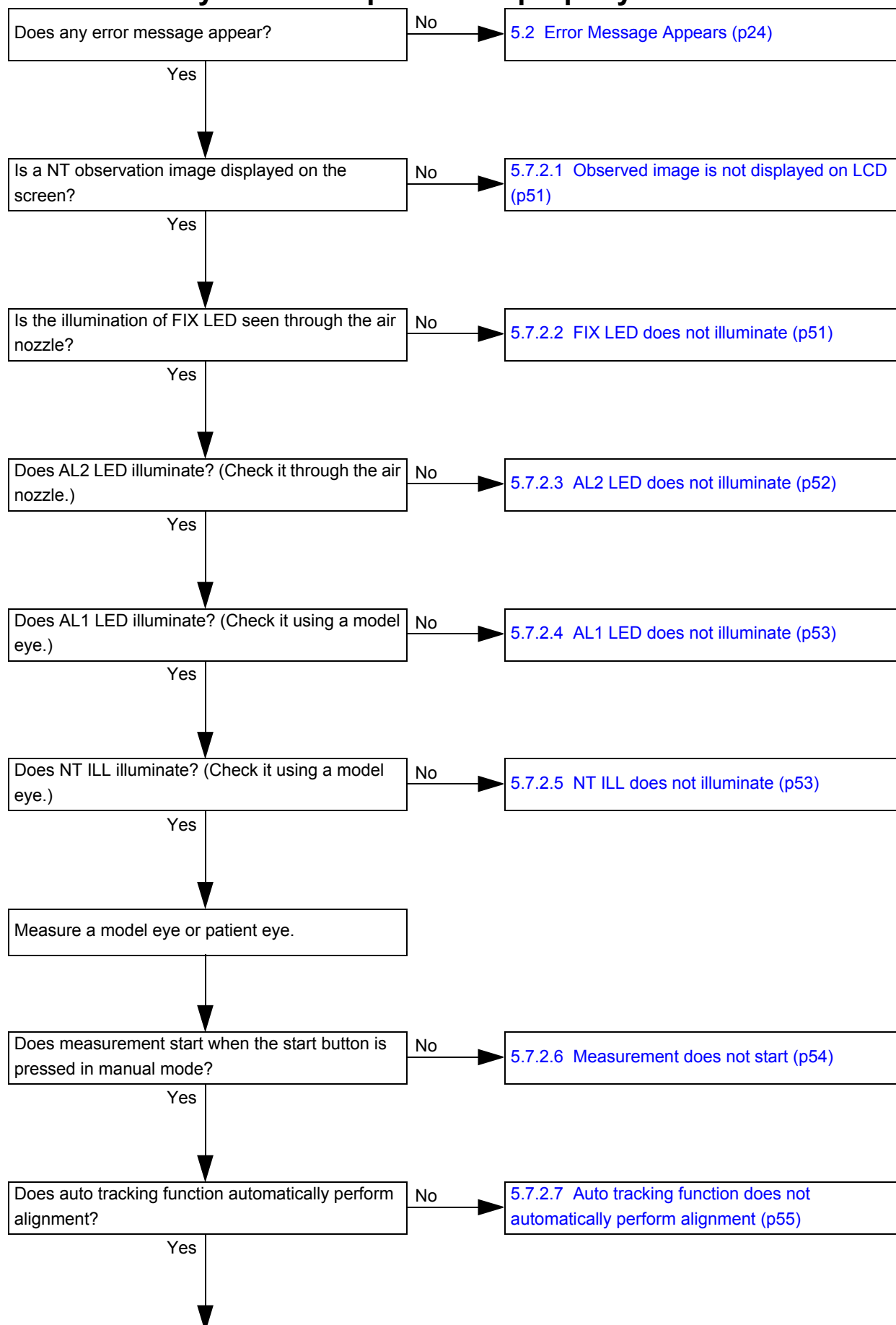
5.7.1.1 Blue light does not illuminate during pachymetry

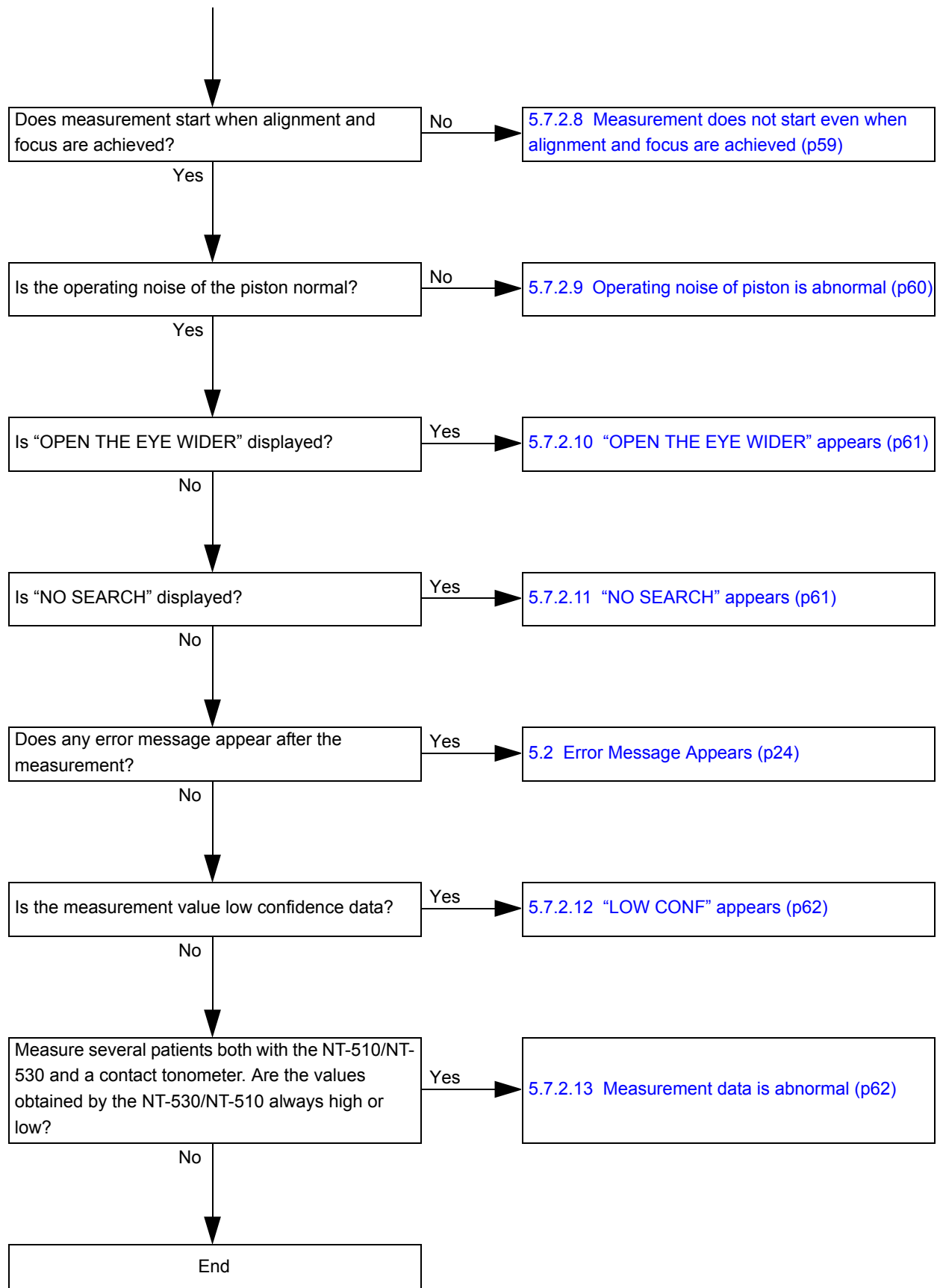


5.7.1.2 Pachymetry image is not displayed

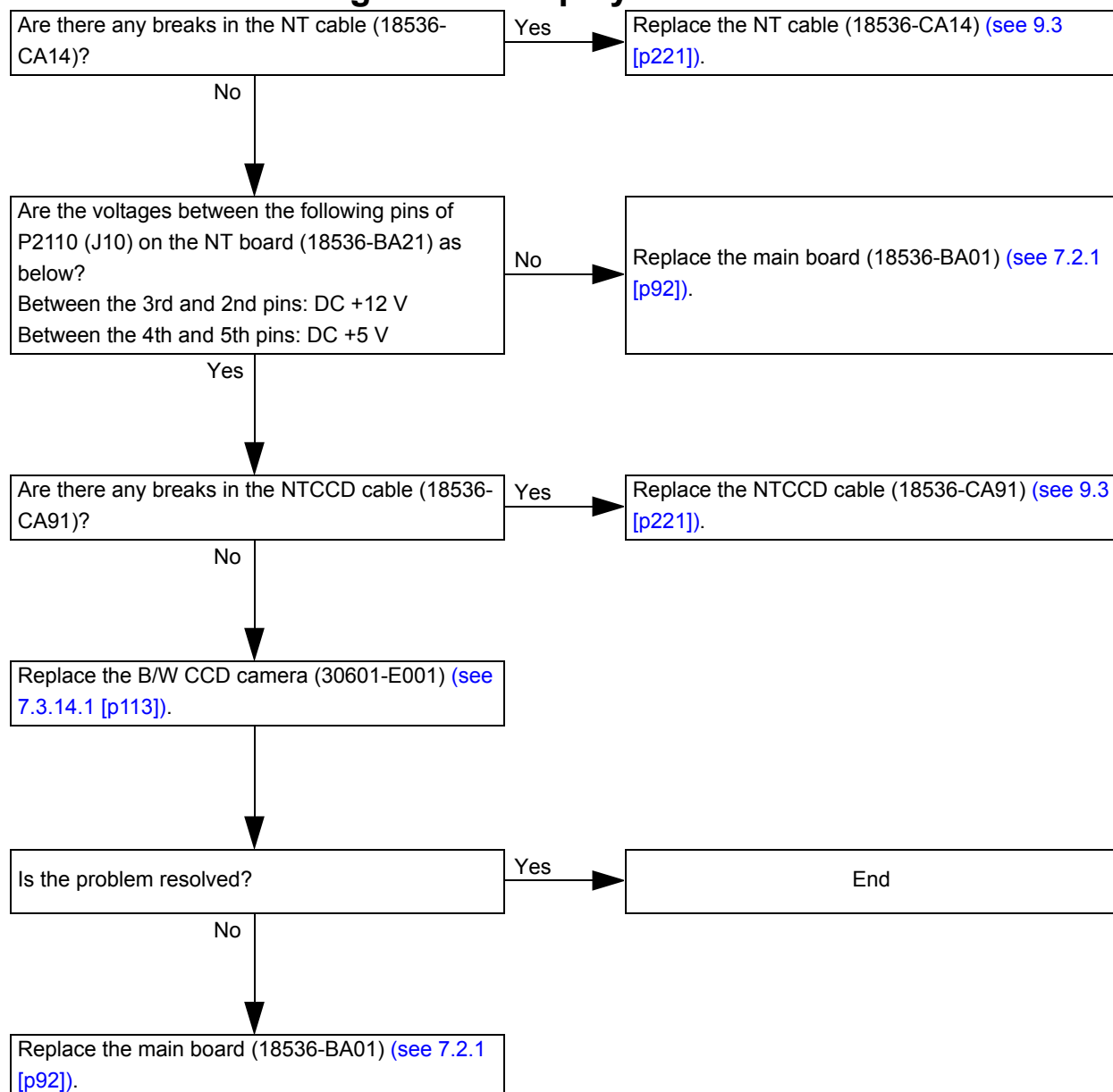


5.7.2 Tonometry cannot be performed properly

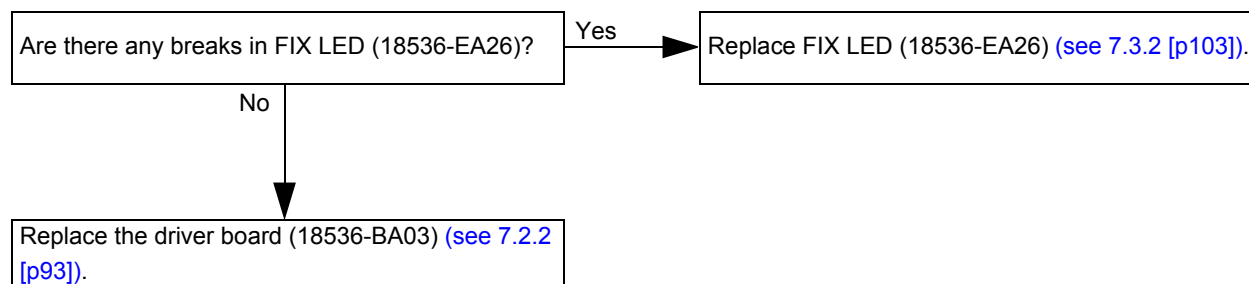




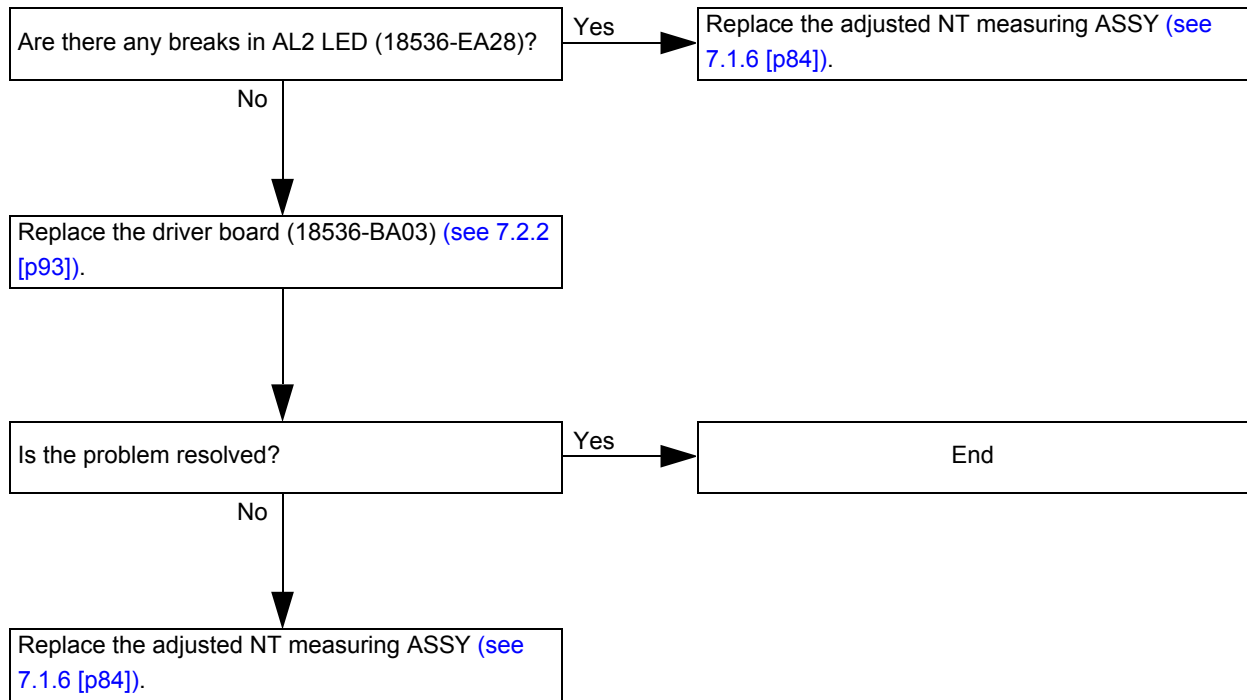
5.7.2.1 Observed image is not displayed on LCD



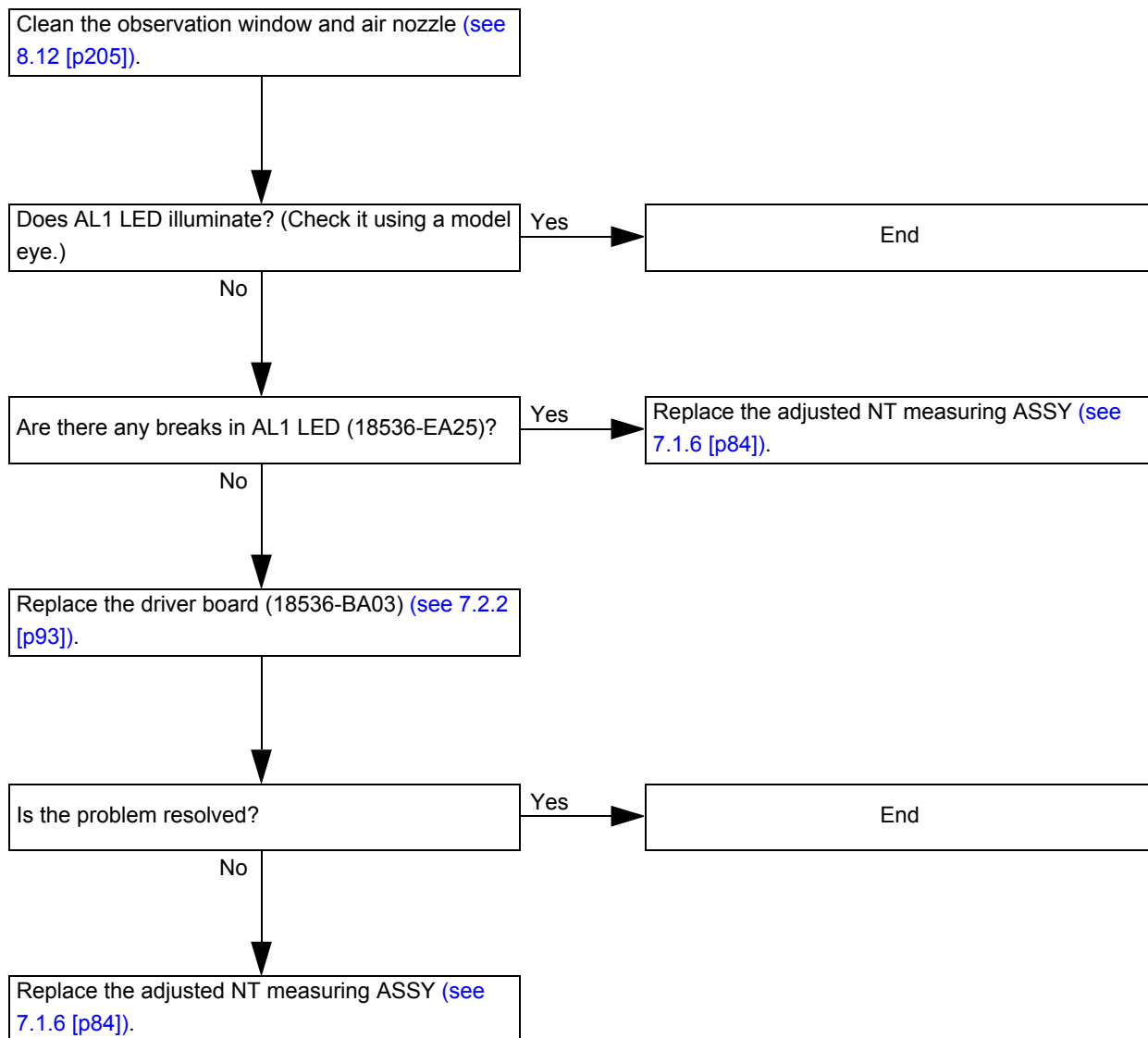
5.7.2.2 FIX LED does not illuminate



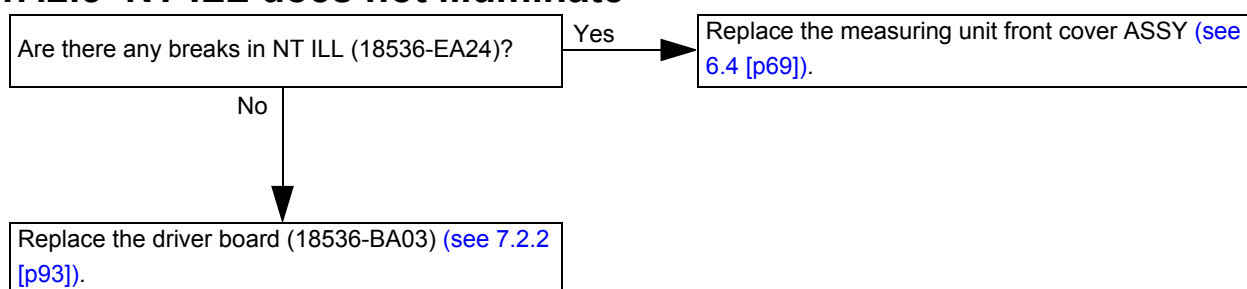
5.7.2.3 AL2 LED does not illuminate



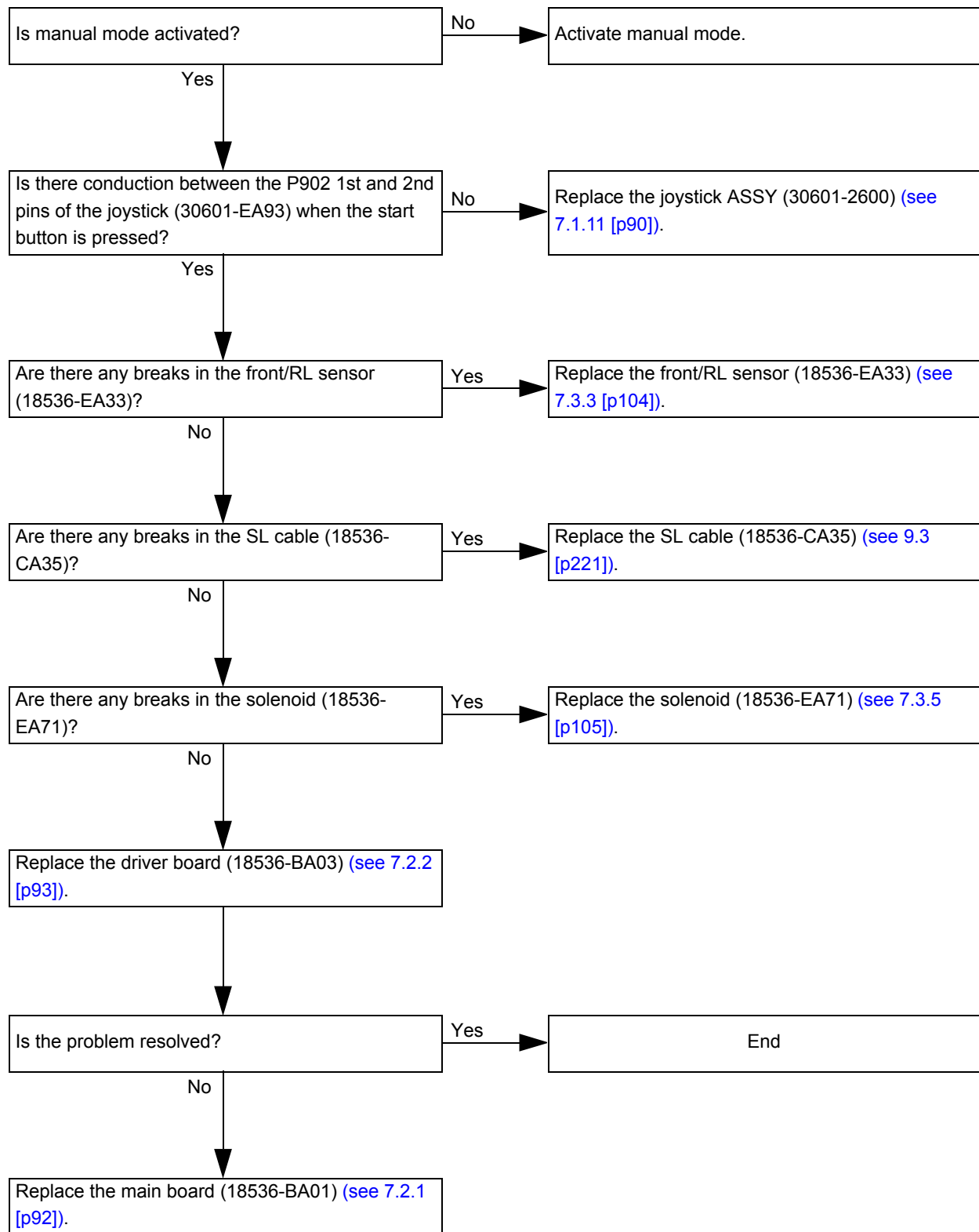
5.7.2.4 AL1 LED does not illuminate



5.7.2.5 NT ILL does not illuminate

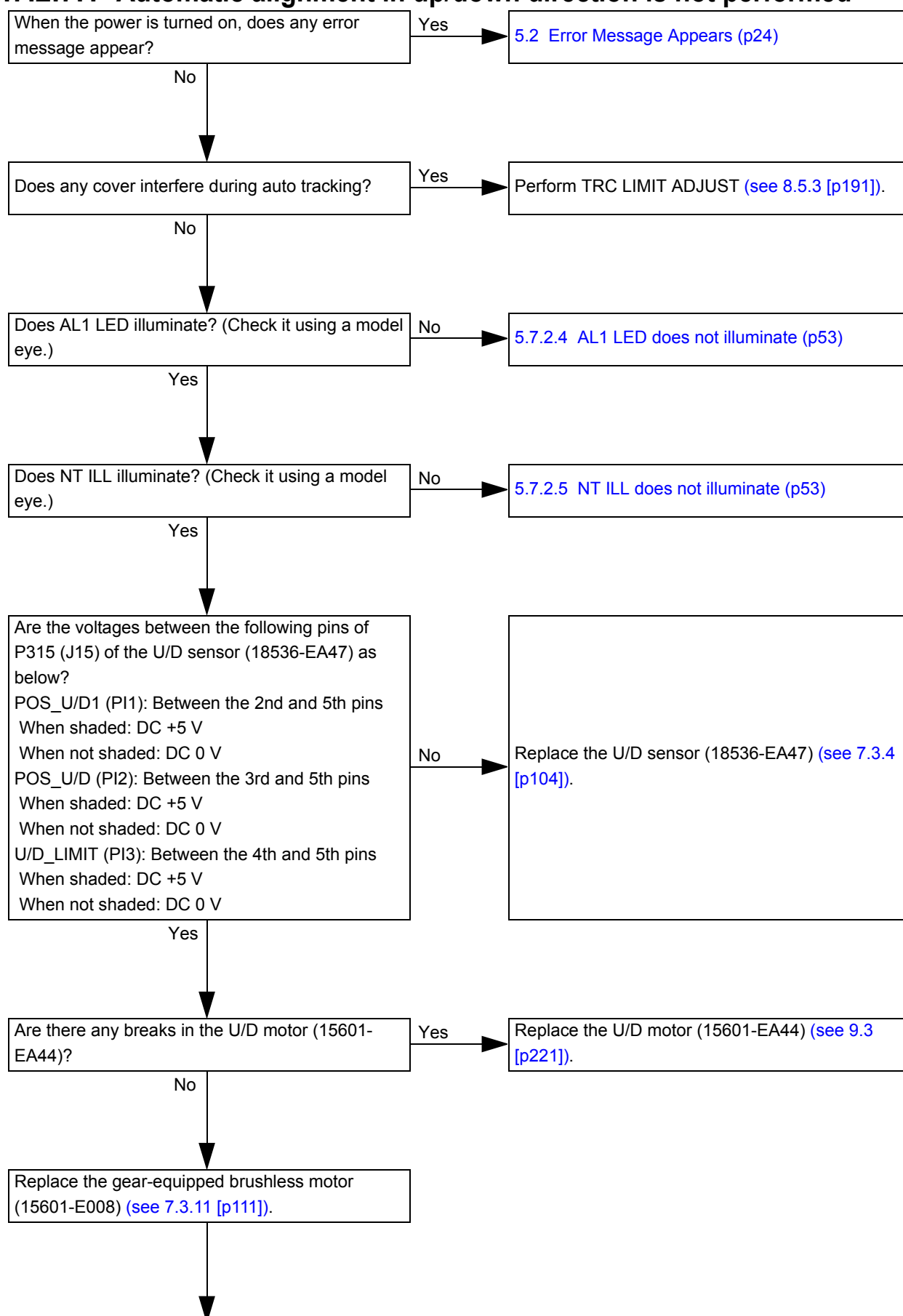


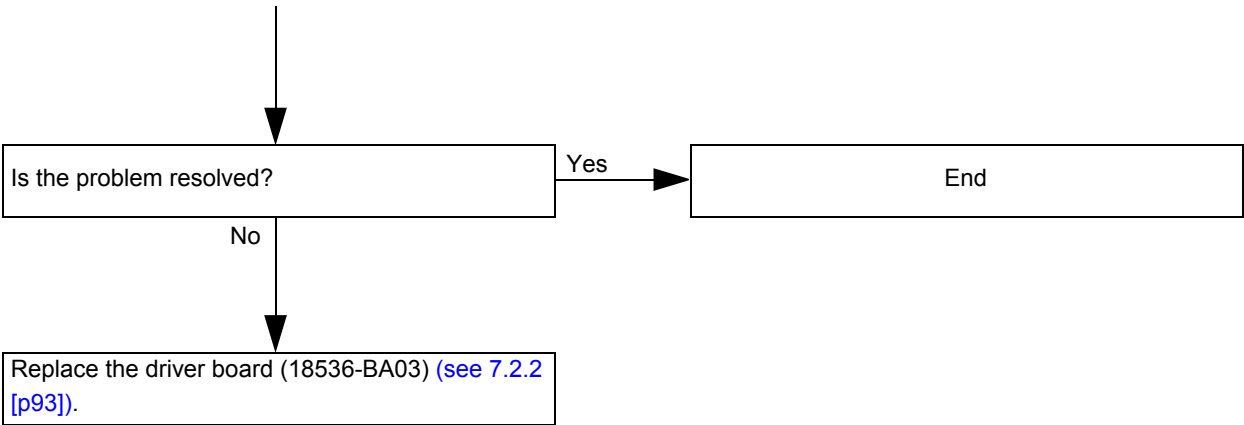
5.7.2.6 Measurement does not start



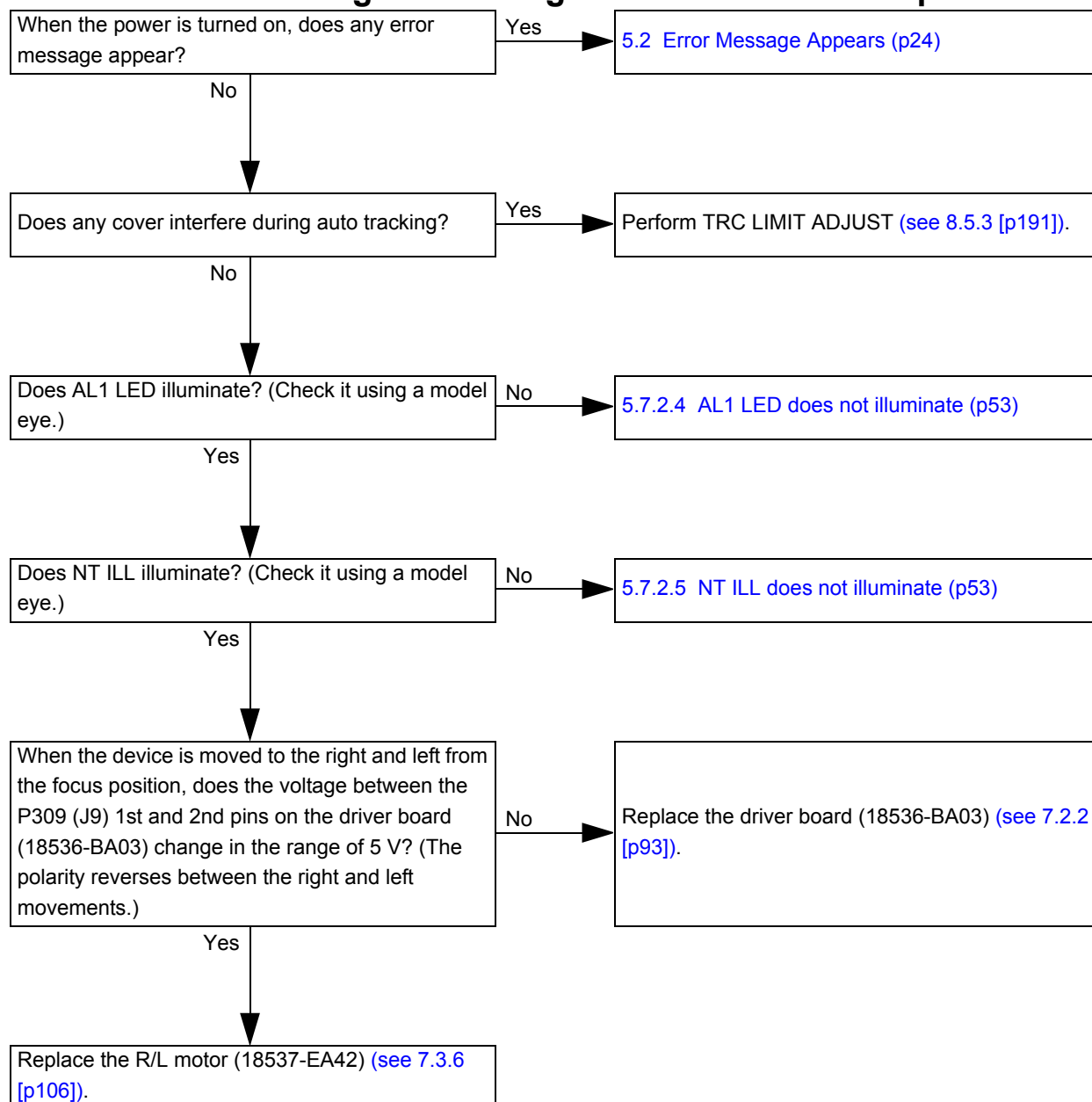
5.7.2.7 Auto tracking function does not automatically perform alignment

5.7.2.7.1 Automatic alignment in up/down direction is not performed

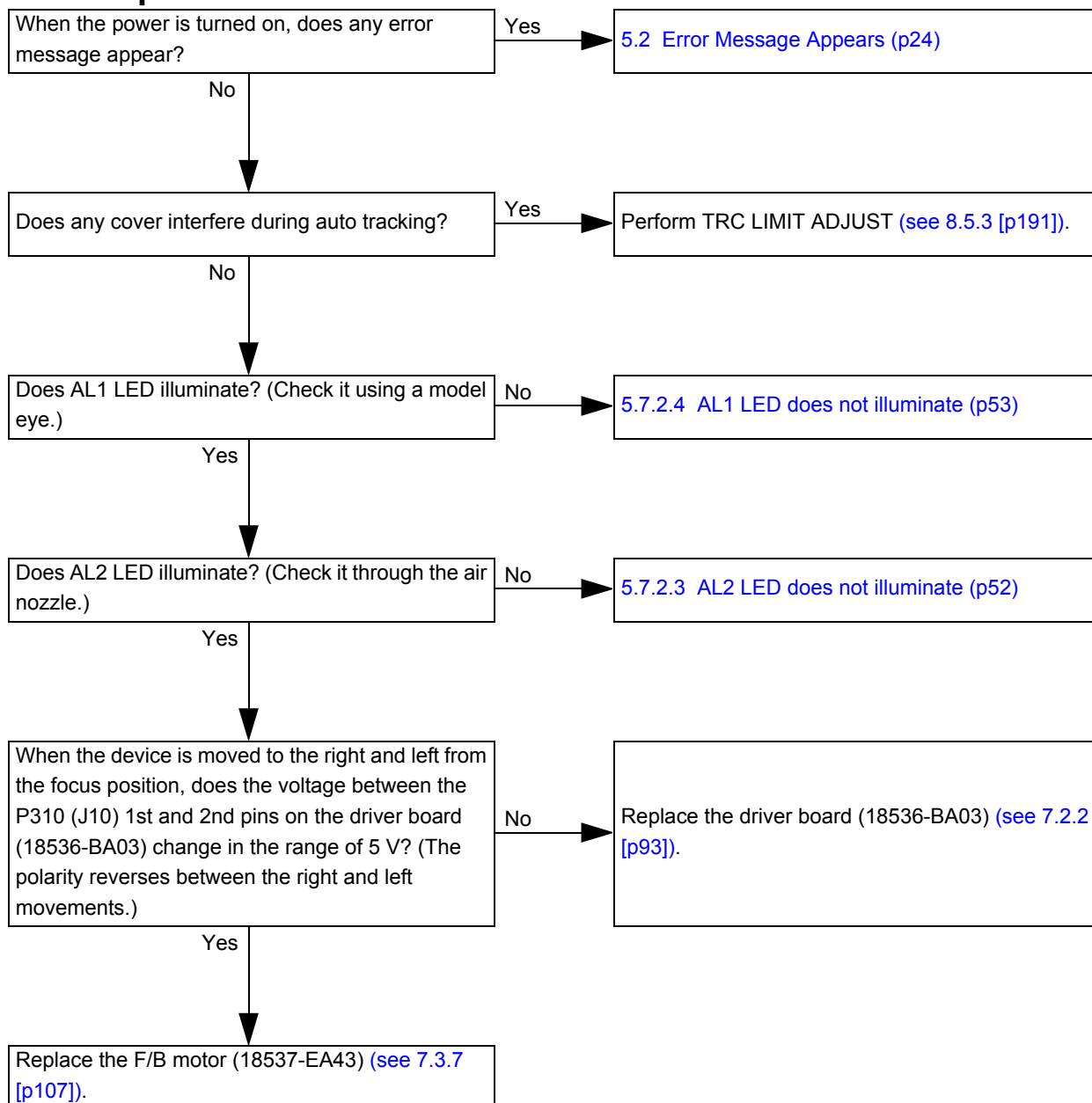




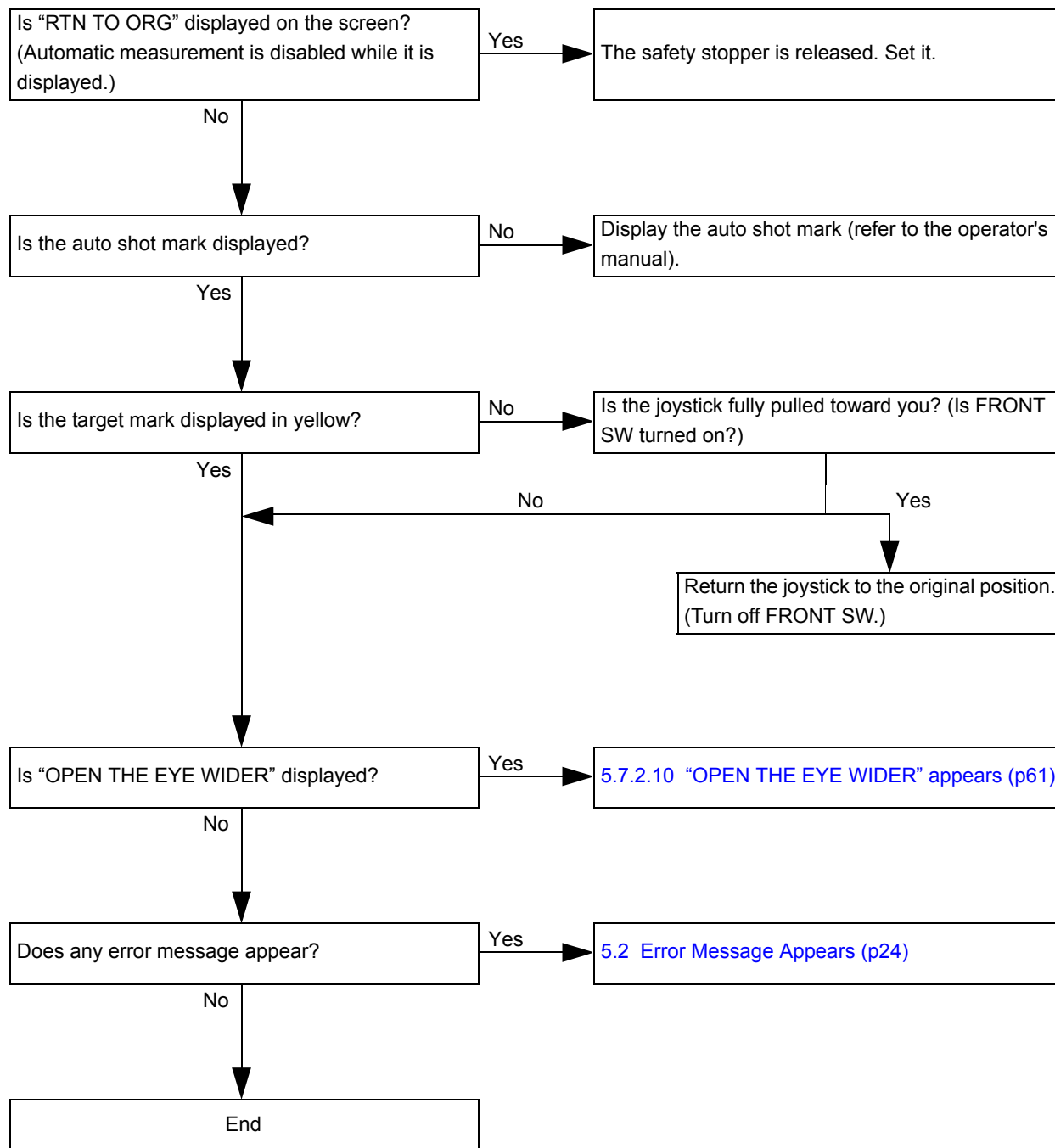
5.7.2.7.2 Automatic alignment in right/left direction is not performed



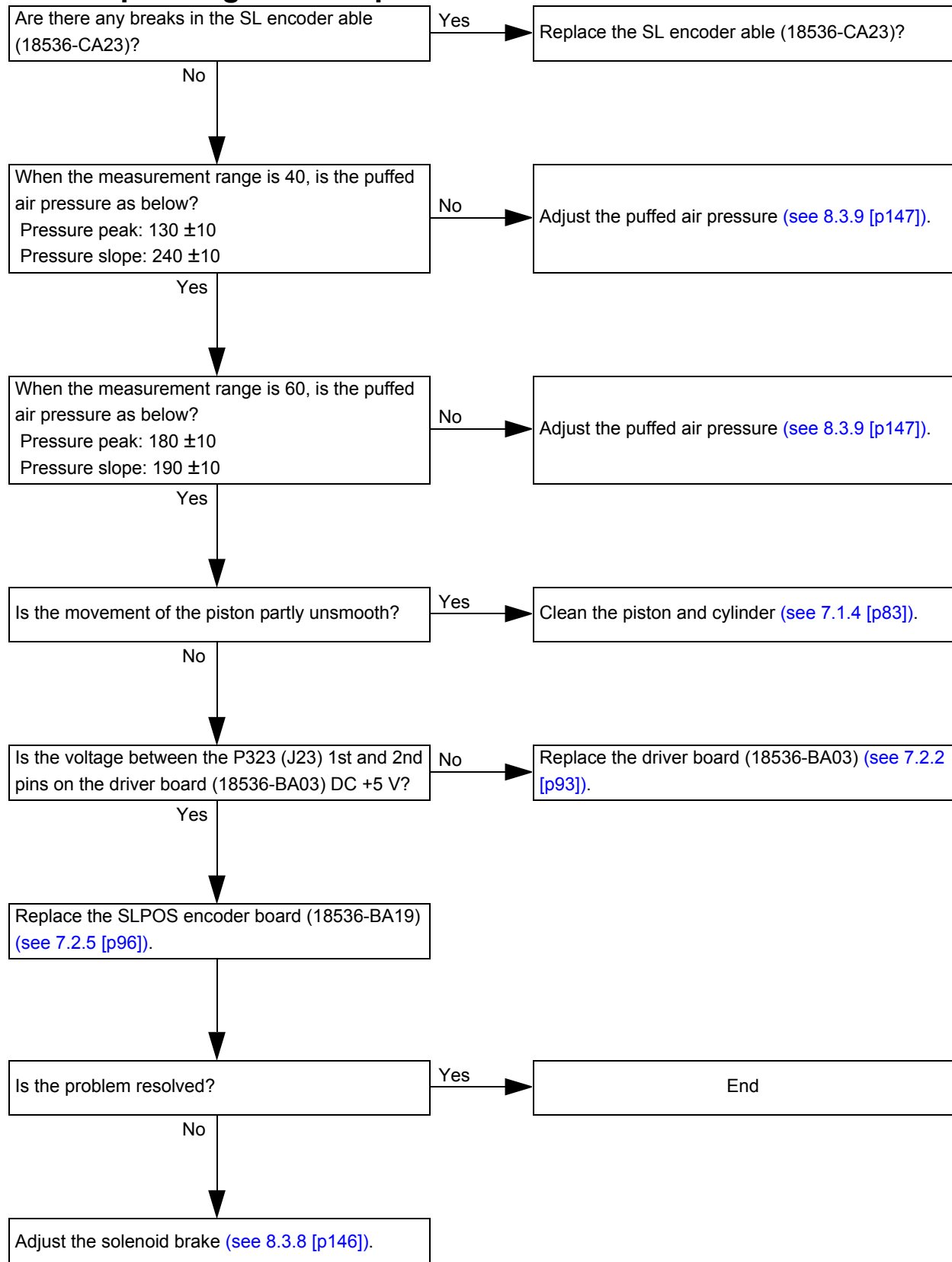
5.7.2.7.3 Automatic alignment in forward/backward direction is not performed



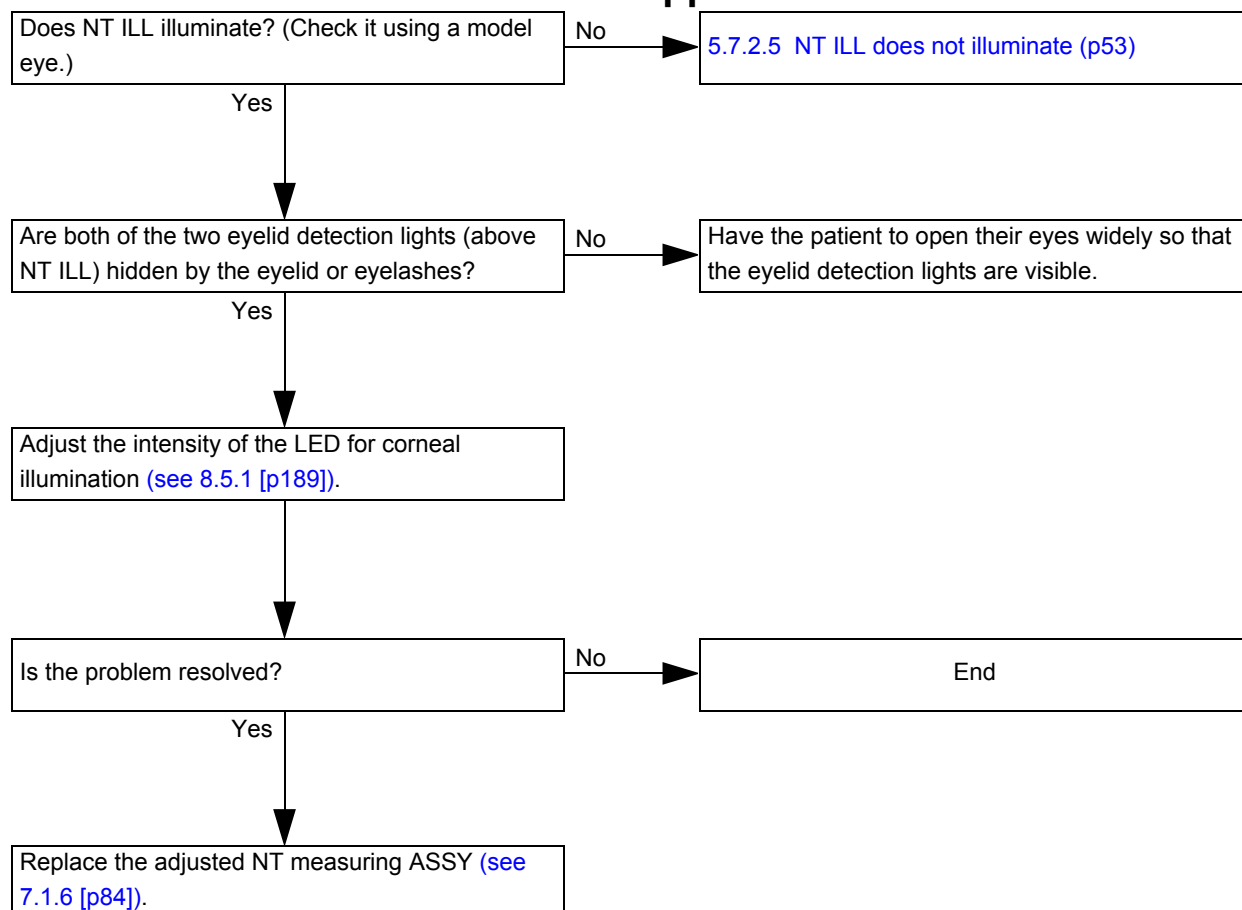
5.7.2.8 Measurement does not start even when alignment and focus are achieved



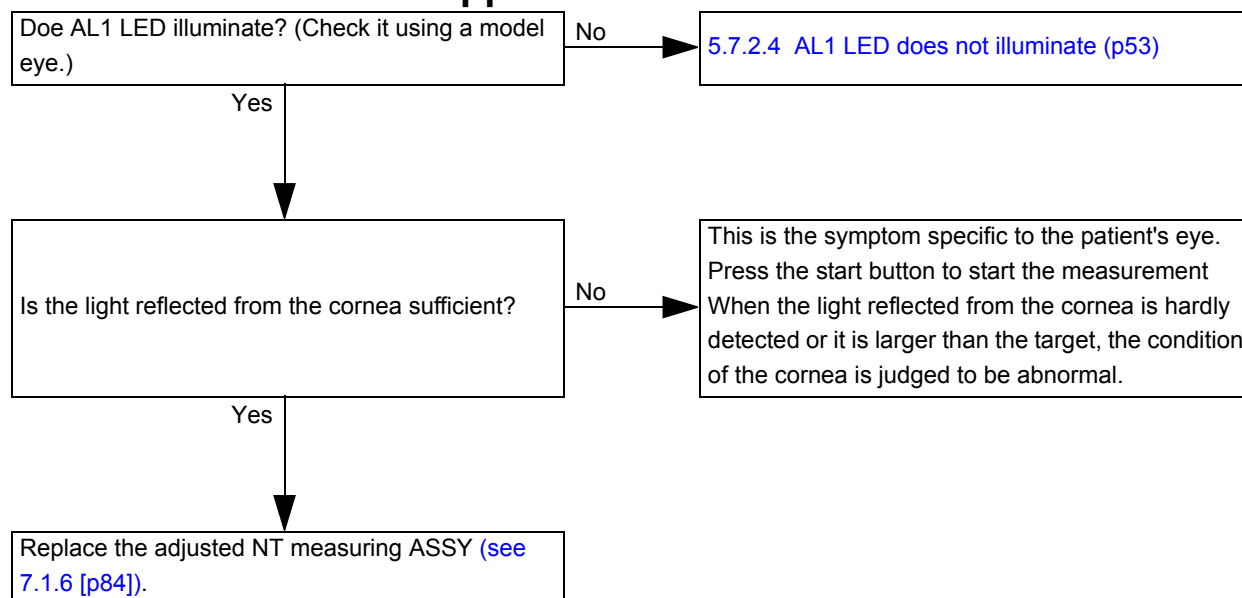
5.7.2.9 Operating noise of piston is abnormal



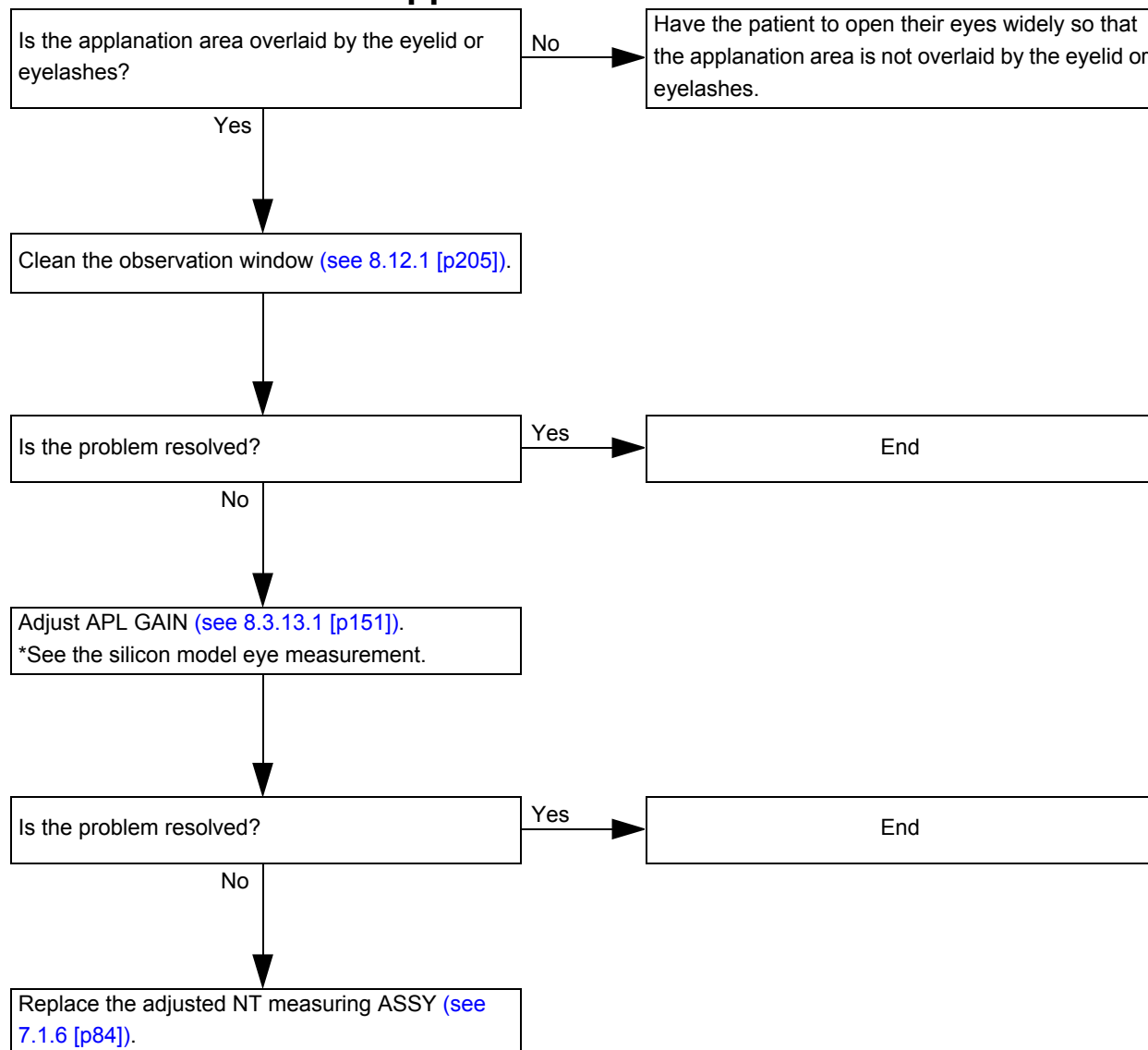
5.7.2.10 “OPEN THE EYE WIDER” appears



5.7.2.11 “NO SEARCH” appears



5.7.2.12 “LOW CONF” appears



5.7.2.13 Measurement data is abnormal

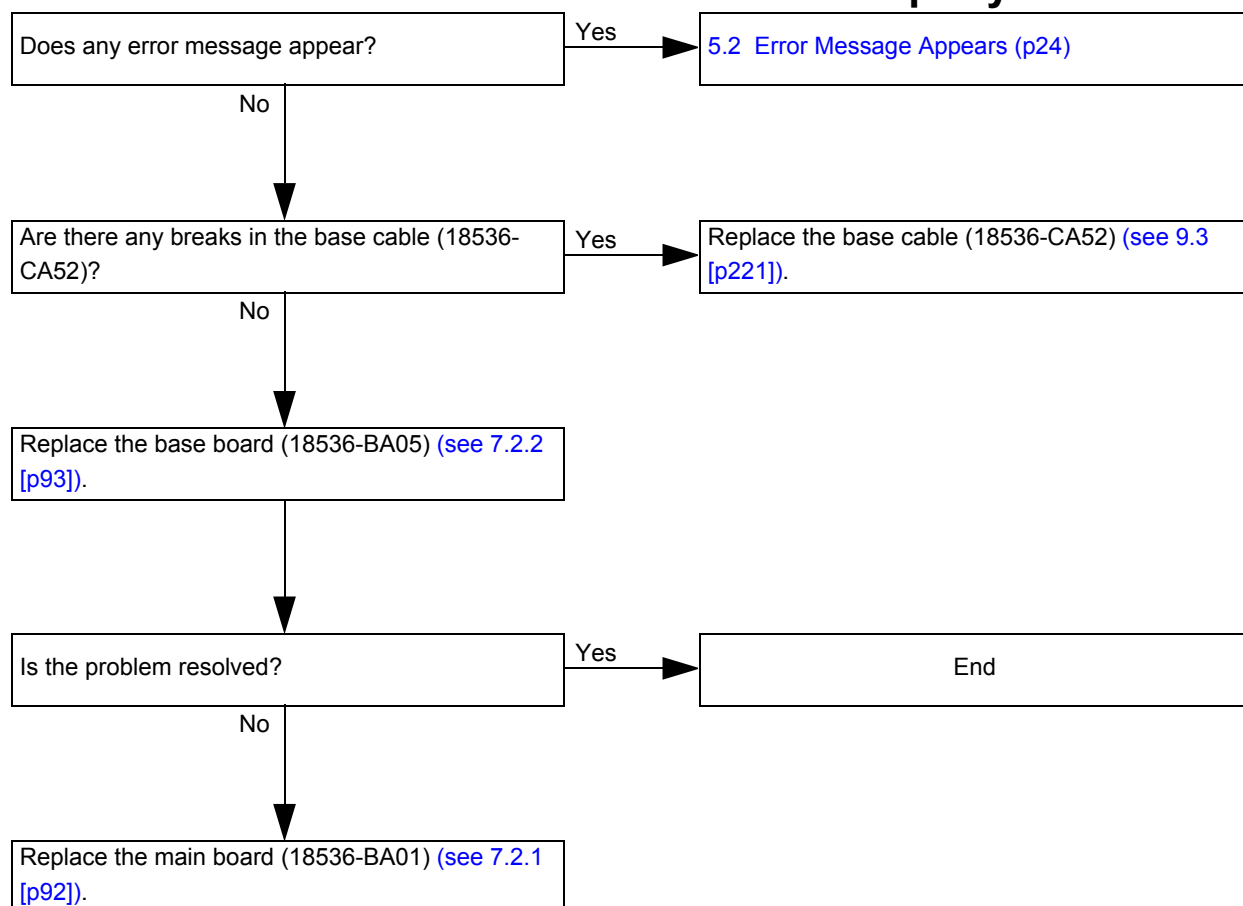
Measure several patients' eyes with the NT-510/NT-530/NT-530P and a contact tonometer. If the data obtained by the NT-510/NT-530/NT-530P is always higher or lower than that obtained by the contact tonometer, adjust A CONSTANT and B CONSTANT (see 8.3.14 [p154]).



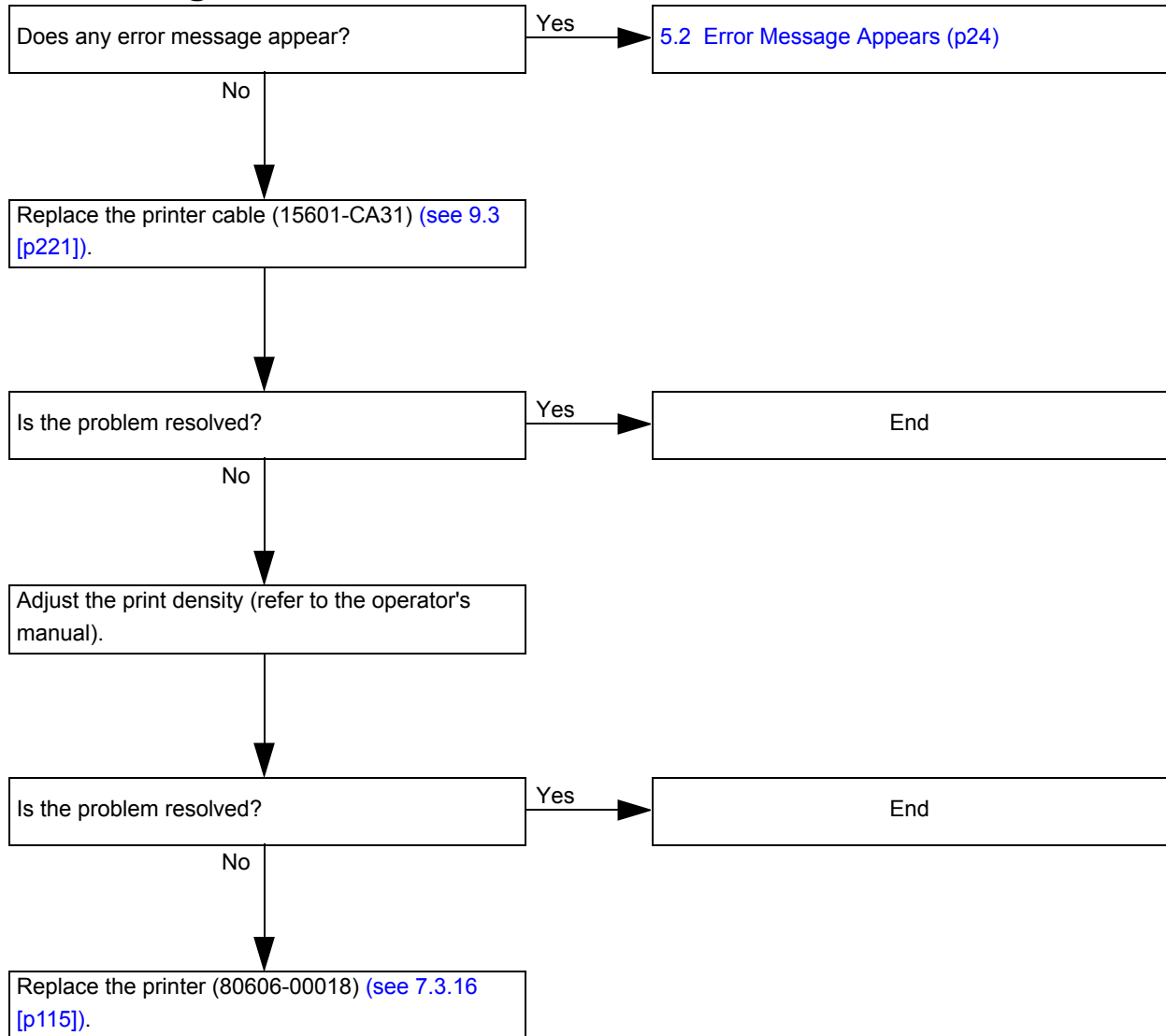
Caution

Before adjusting A CONSTANT and B CONSTANT, be sure to receive permission from the person responsible for handling the device.

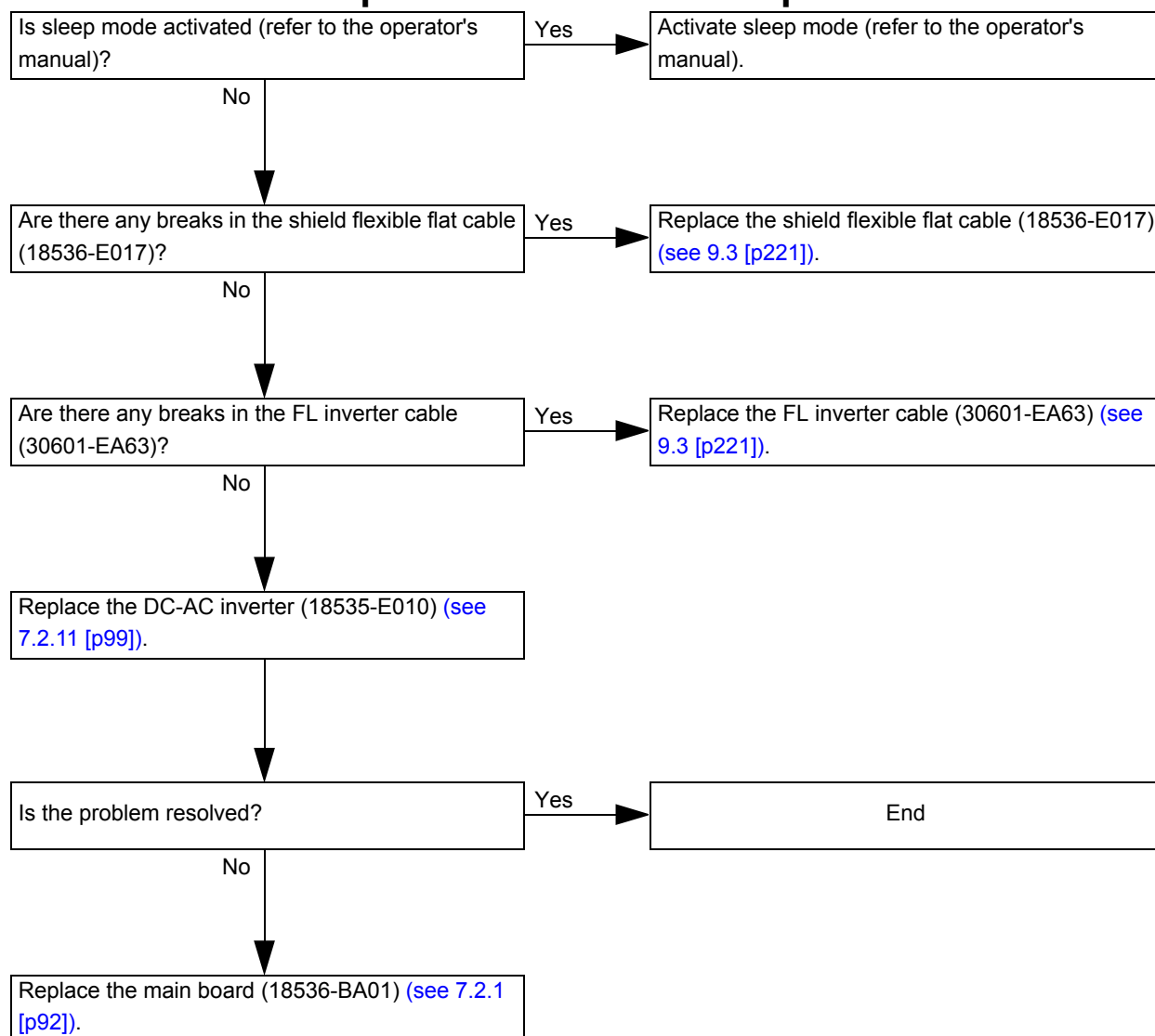
5.8 Communication cannot be Performed Properly



5.9 Printing cannot be Performed



5.10 LCD Auto-Sleep Function does not Operate

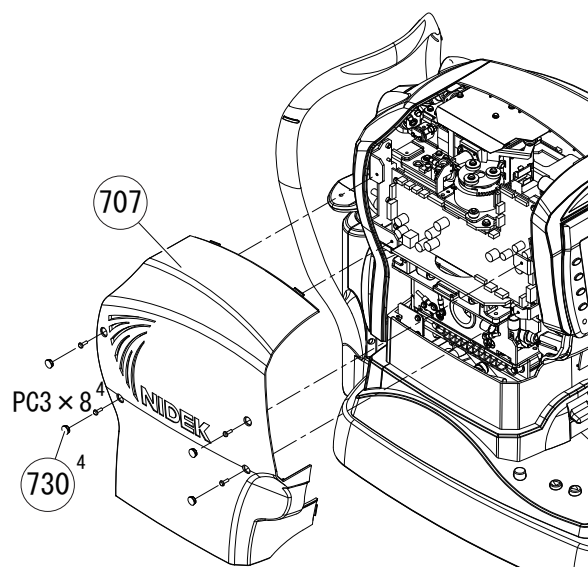


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6 REMOVAL PROCEDURE

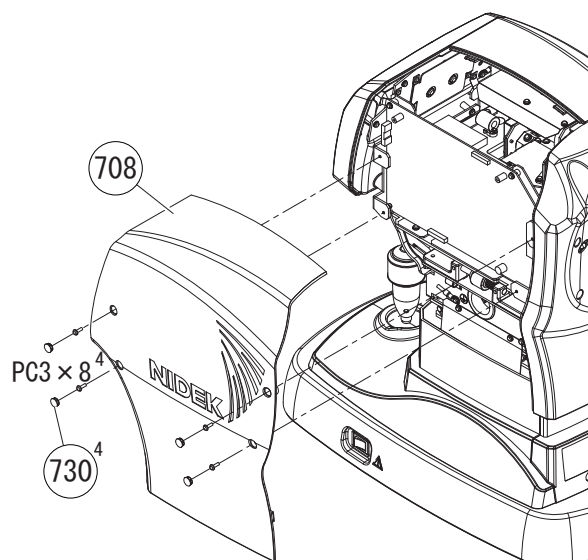
6.1 Measuring Unit Left Cover (18536-M707)

- 1 . Remove the caps (32105-M730 [n = 4]).
- 2 . Unscrew PC3 × 8 (n = 4).
- 3 . Remove the measuring unit left cover (18536-M707).
- 4 . Reassemble the parts in the reverse order.



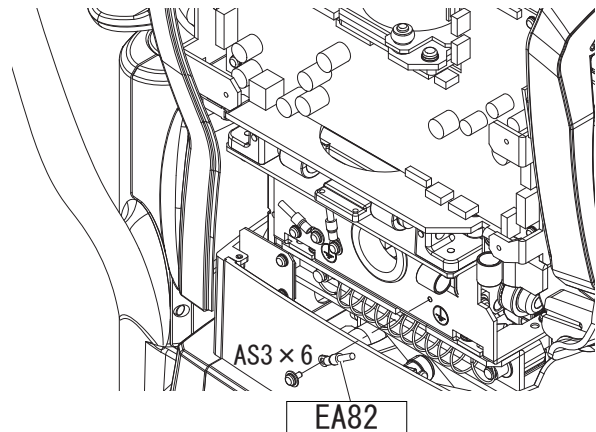
6.2 Measuring Unit Right Cover (18536-M708)

- 1 . Remove the caps (32105-M730 [n = 4]).
- 2 . Unscrew PC3 × 8 (n = 4).
- 3 . Remove the measuring unit right cover (18536-M708).
- 4 . Reassemble the parts in the reverse order.

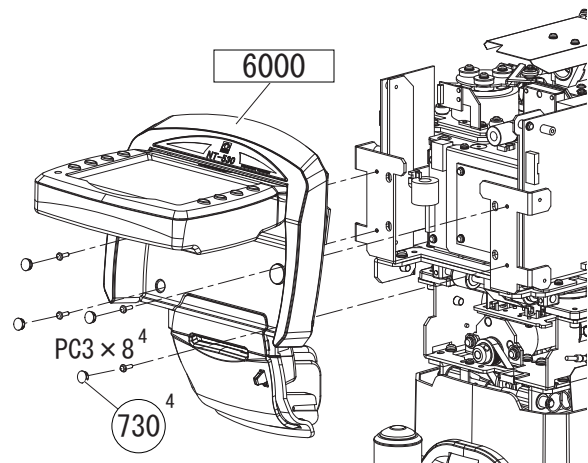


6.3 Measuring Unit Rear Cover ASSY (18536-6000)

- 1 . Remove the measuring unit left cover (18536-M707) (see 6.1 [p67]).
- 2 . Remove the measuring unit right cover (18536-M708) (see 6.2 [p67]).
- 3 . Unscrew AS3 × 6 to disconnect the F.GND3 cable (30601-EA82).




- 4 . Remove the caps (32105-M730 [n = 4]).
- 5 . Disconnect P311 (J11), P316 (J16), and P317 (J17) on the driver board (18536-BA03) and P102 (J2) on the main board (18536-BA01).
- 6 . Unscrew PC3 × 8 (n = 4) to remove the measuring unit rear cover ASSY (18536-6000).
- 7 . Reassemble the parts in the reverse order.

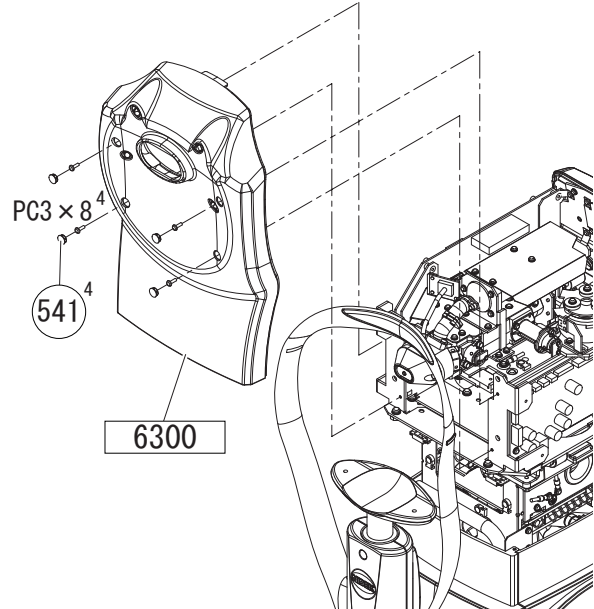


6.4 Measuring Unit Front Cover ASSY

6.4.1 NT-510/NT-530 measuring unit front cover ASSY (18536-6300)


- 1 . Remove the measuring unit left cover (18536-M707) (see 6.1 [p67]).
- 2 . Remove the measuring unit right cover (18536-M708) (see 6.2 [p67]).
- 3 . Disconnect P304 (J4) on the driver board (18536-BA03).
- 4 . Remove the caps (32909-M541 [n =4]).
- 5 . Unscrew PC3 × 8 (n = 4) to remove the measuring unit front cover ASSY (18536-6300).
- 6 . Reassemble the parts in the reverse order.

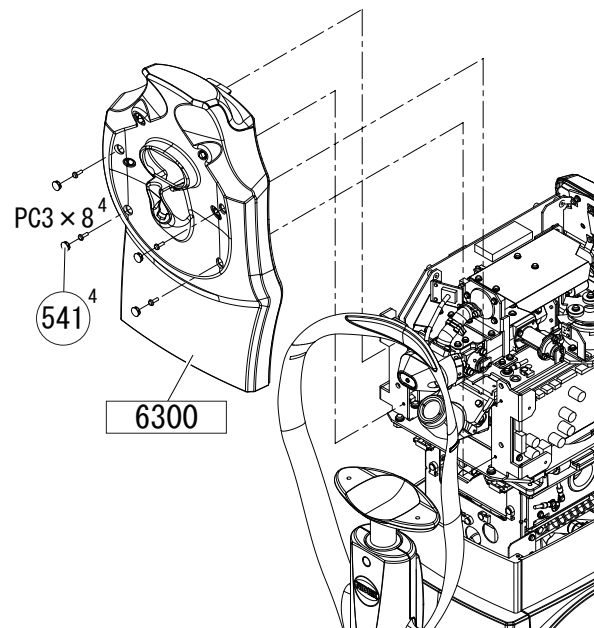
 Caution	Adjust the intensity of LED for corneal illumination after replacing the measuring unit front cover ASSY (18536-6300) (see 8.5.1 [p189]).
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6.4.2 NT-530P measuring unit front cover ASSY (18538-6300)

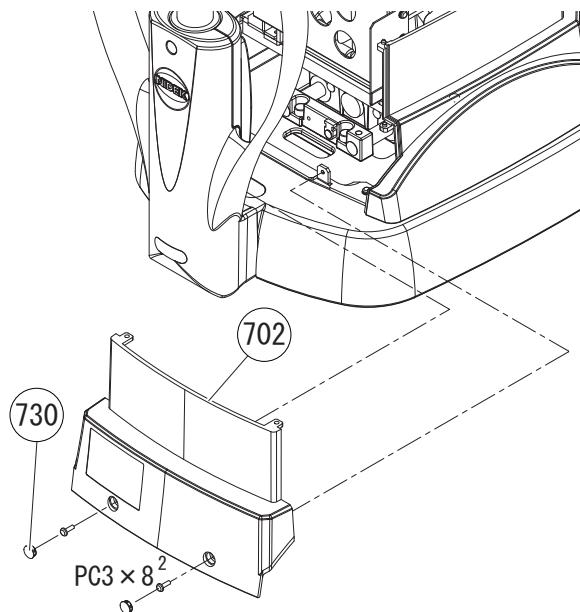
- 1 . Remove the measuring unit left cover (18536-M707) (see 6.1 [p67]).
- 2 . Remove the measuring unit right cover (18536-M708) (see 6.2 [p67]).
- 3 . Disconnect P304 (J4) on the driver board (18536-BA03).
- 4 . Remove the caps (32909-M541 [n =4]).
- 5 . Unscrew PC3 × 8 (n = 4) to remove the measuring unit front cover ASSY (18538-6300).
- 6 . Reassemble the parts in the reverse order.

 Caution	Adjust the intensity of LED for corneal illumination after replacing the measuring unit front cover ASSY (18538-6300) (see 8.5.1 [p189]).
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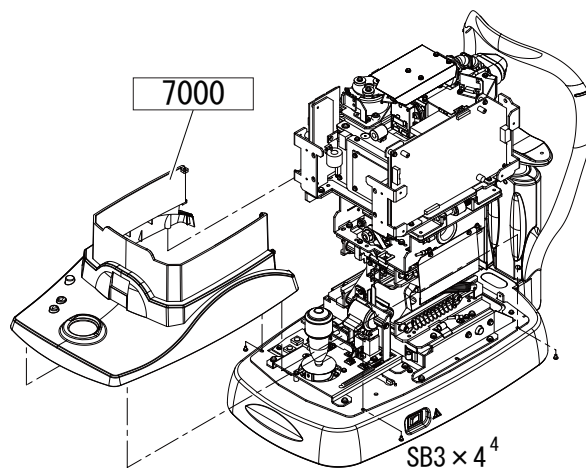
6.5 Body Front Cover (18536-M702)

- 1 . Remove the following measuring unit front cover ASSY.
 - 1) NT-510/NT-530 measuring unit front cover ASSY (18536-6300) (See 6.4.1 [p69].)
 - 2) NT-530P measuring unit front cover ASSY (18538-6300) (See 6.4.2 [p69].)
- 2 . Remove the caps (32105-M730 [n = 2]).
- 3 . Unscrew PC3 × 8 (n = 2) to remove the body front cover (18536-M702).
- 4 . Reassemble the parts in the reverse order.



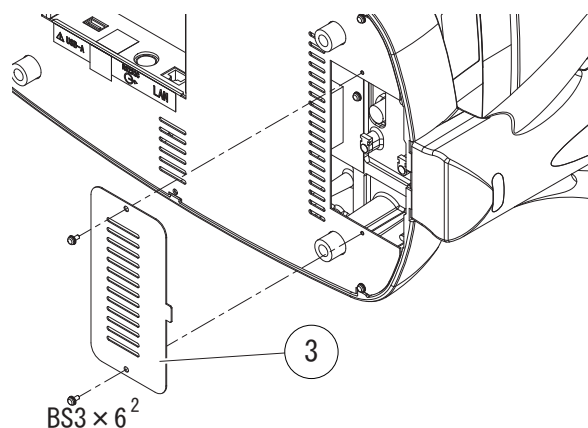
6.6 Body Cover ASSY (18536-7000)

- 1 . Remove the measuring unit rear cover ASSY (18536-6000) (see 6.3 [p68]).
- 2 . Remove the body front cover (18536-M702) (see 6.5 [p70]).
- 3 . Unscrew SB3 × 4 (n = 4) to remove the body cover ASSY (18536-7000).
- 4 . Reassemble the parts in the reverse order.



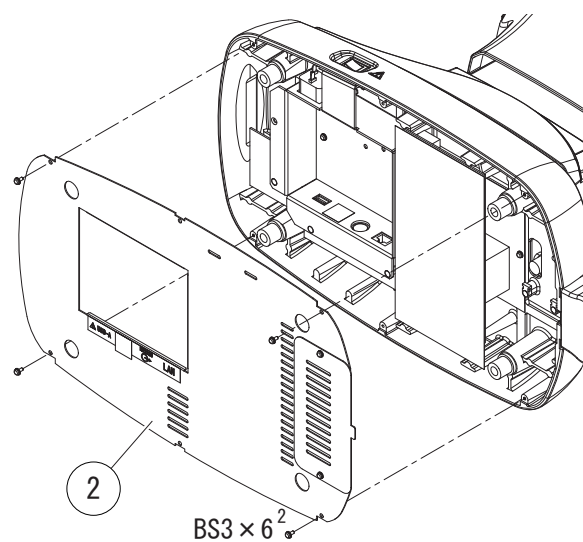
6.7 Lid (30601-M003)

- 1 . Unscrew BS3 × 6 (n = 2).
- 2 . Remove the lid (30601-M003).
- 3 . Reassemble the parts in the reverse order.



6.8 Bottom Plate (30601-M002)

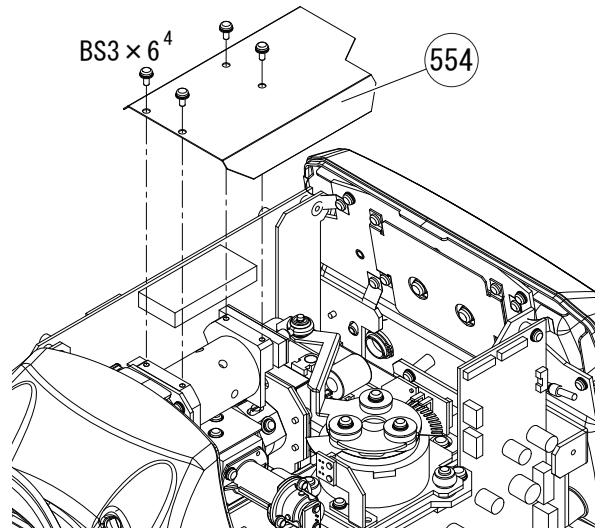
- 1 . Unscrew BS3 × 6 (n = 4).
- 2 . Remove the bottom plate (30601-M002) along with the lid (30601-M003).
- 3 . Reassemble the parts in the reverse order.



6.9 Dust Cover

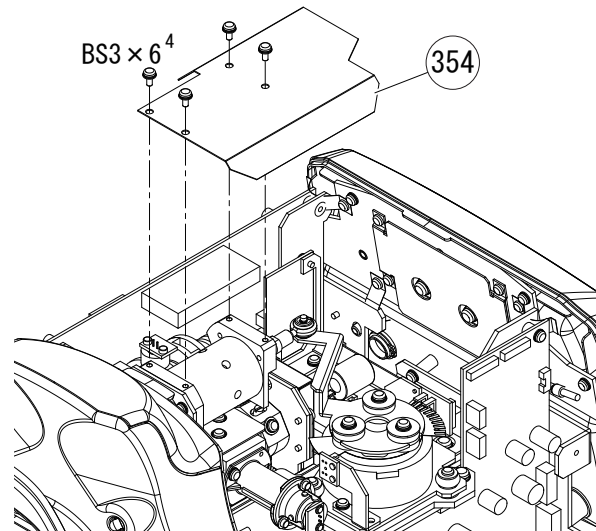
6.9.1 NT-510/NT-530 dust cover (15601-M554)

- 1 . Remove the measuring unit left cover (18536-M707) ([see 6.1 \[p67\]](#)).
- 2 . Remove the measuring unit right cover (18536-M708) ([see 6.2 \[p67\]](#)).
- 3 . Unscrew BS3 × 6 (n = 4) to remove the dust cover (15601-M554).
- 4 . Reassemble the parts in the reverse order.



6.9.2 NT-530P dust cover (18538-M354)

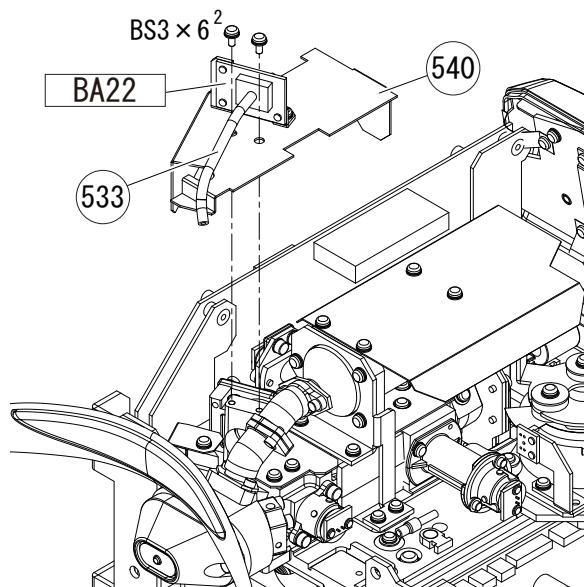
- 1 . Remove the measuring unit left cover (18536-M707) ([see 6.1 \[p67\]](#)).
- 2 . Remove the measuring unit right cover (18536-M708) ([see 6.2 \[p67\]](#)).
- 3 . Unscrew BS3 × 6 (n = 4) to remove the dust cover (18538-M354).
- 4 . Reassemble the parts in the reverse order.



6.10 Cover

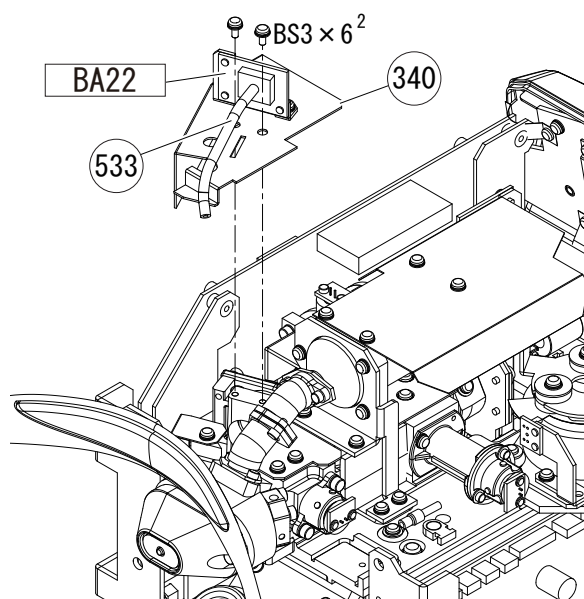
6.10.1 NT-510/NT-530 cover (18536-M540)

- 1 . Remove the measuring unit front cover ASSY (18536-6300) ([see 6.4.1 \[p69\]](#)).
- 2 . Disconnect P2201 (J1) on the pressure sensor board (18536-BA22).
- 3 . Remove the silicon tube (15601-M533) from the barbed joint (82001-PF001).
- 4 . Unscrew BS3 × 6 (n = 2) to remove the cover (18536-M540) along with the pressure sensor board (18536-BA22) and silicon tube (15601-M533).
- 5 . Reassemble the parts in the reverse order.



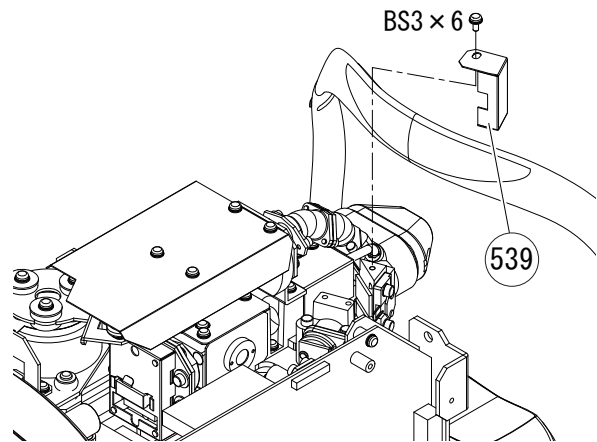
6.10.2 NT-530P cover (18538-M340)

- 1 . Remove the measuring unit front cover ASSY (18538-6300) ([see 6.4.2 \[p69\]](#)).
- 2 . Disconnect P2201 (J1) on the pressure sensor board (18536-BA22).
- 3 . Remove the silicon tube (15601-M533) from the barbed joint (82001-PF001).
- 4 . Unscrew BS3 × 6 (n = 2) to remove the cover (18538-M340) along with the pressure sensor board (15-BA22) and silicon tube (15601-M533).
- 5 . Reassemble the parts in the reverse order.



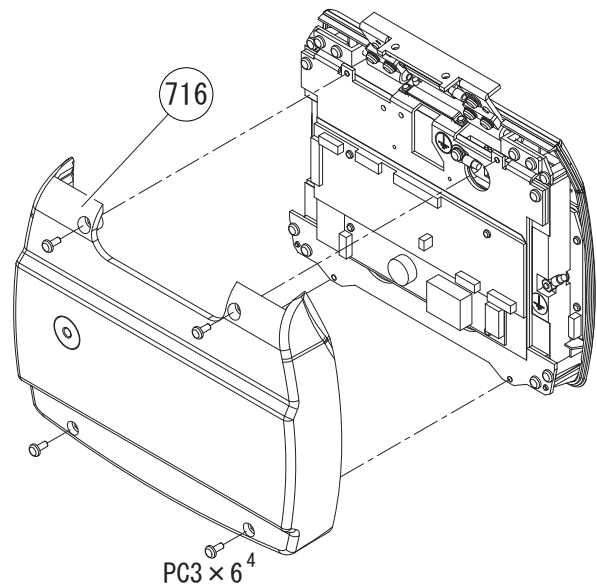
6.11 APLPD Shield (18536-M539)

- 1 . Remove the following cover ([see 6.10 \[p73\]](#)).
 - 1) NT-510/NT-530 cover (18536-M540)
 - 2) NT-530P cover (18538-M340)
- 2 . Unscrew BS3 × 6 to remove the APLPD shield (18536-M539).
- 3 . Reassemble the parts in the reverse order.



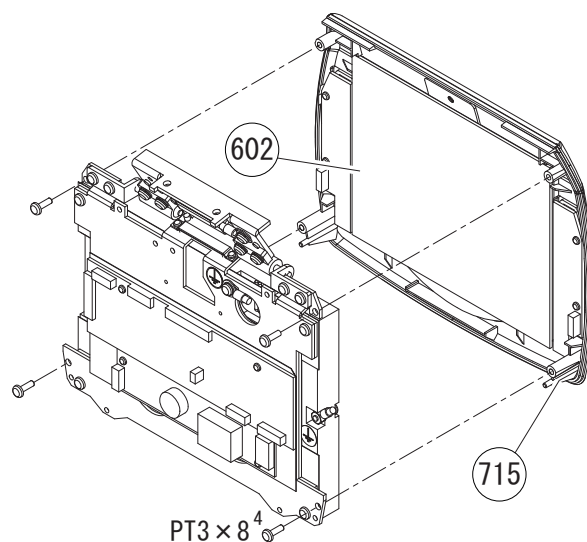
6.12 LCD Rear Cover (30601-M716)

- 1 . Remove the LCD ASSY (18536-6100) ([see 7.1.5 \[p83\]](#)).
- 2 . Unscrew PC3 × 6 (n = 4) to remove the LCD rear cover (30601-M716).
- 3 . Reassemble the parts in the reverse order.



6.13 LCD Front Cover (30601-M715)

- 1 . Remove the LCD rear cover (30601-M716) ([see 6.12 \[p74\]](#)).
- 2 . Disconnect all connectors on the panel SW L board (30601-BA07) and panel SW R board (30601-BA15).
- 3 . Unscrew PT3 × 8 (n = 4) to remove the LCD front cover (30611-M715) along with the protective panel (30601-M602).
- 4 . Reassemble the parts in the reverse order.



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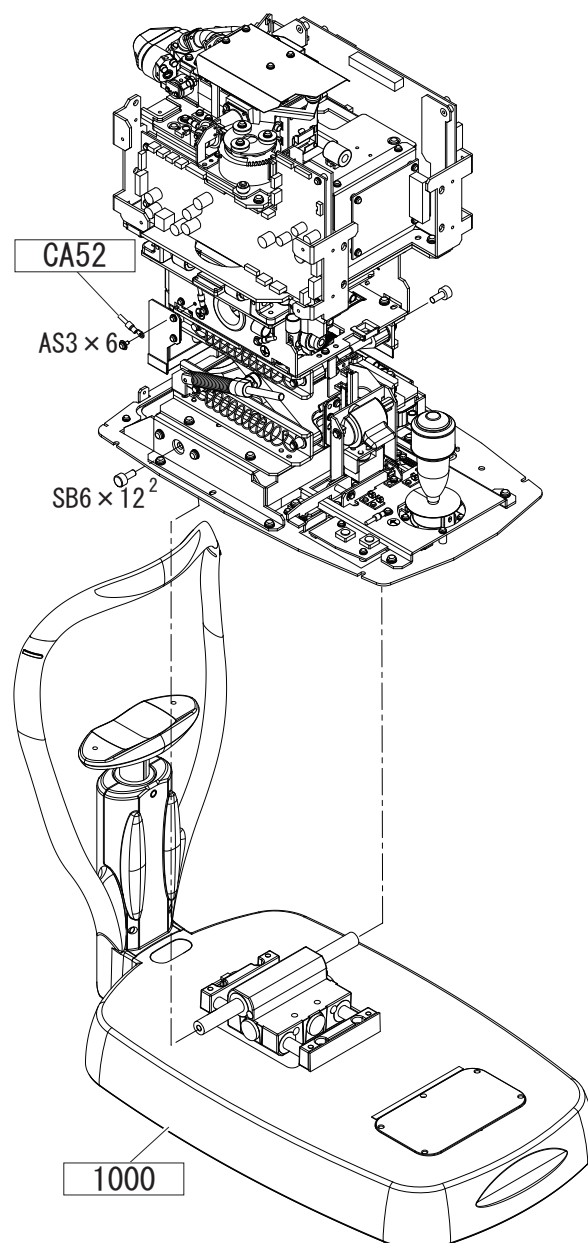
7 REPLACEMENT PROCEDURE

7.1 ASSYs

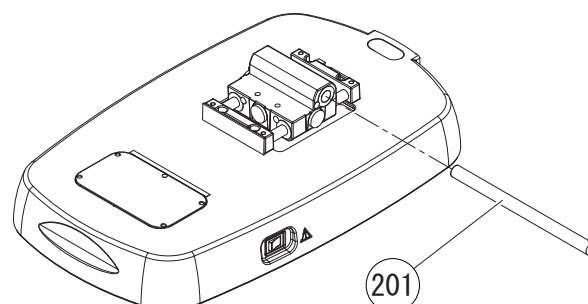
7.1.1 Base ASSY (18536-1000)

Replacement part: 18536-1000

- 1 . Remove the body cover ASSY (18536-7000) ([see 6.6 \[p70\]](#)).
- 2 . Disconnect P103 (J3) on the following main board.
 - 1) NT-510: 18536-BA01P
 - 2) NT-530: 18537-BA01P
 - 3) NT-530P: 18538-BA01P
- 3 . Disconnect P302 (J2) on the driver board (18536-BA03).
- 4 . Unscrew AS3 × 6 to disconnect the ground cable of the base cable (18536-CA52) connected to the body ASSY
- 5 . Unscrew SB6 × 12 (n = 2) to remove the base ASSY (18536-1000) along with the chinrest ASSY (15601-1500).
- 6 . Remove the chinrest ASSY (15601-1500) ([see 7.1.10 \[p90\]](#)).



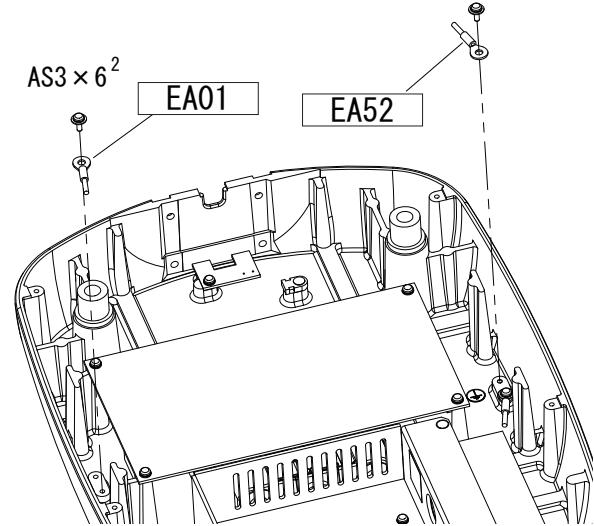
- 7 . Remove the R/L shaft (30601-M201) to replace the base ASSY (18536-1000).
- 8 . Reassemble the parts in the reverse order.




7.1.2 Inlet ASSY (18536-1100)

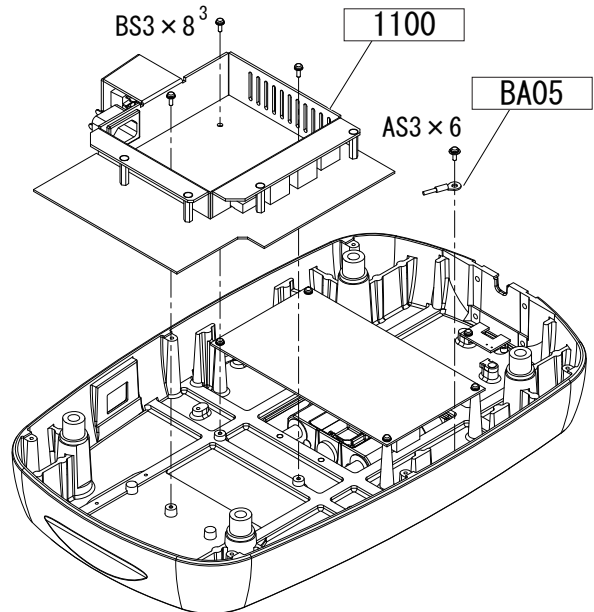
Replacement part: 18536-1100

- 1 . Remove the bottom plate (30601-M002) (see 6.8 [p71]).
- 2 . Disconnect P001 (J1) of the switching power supply (80602-00102).
- 3 . Disconnect all connectors on the base board (15601-BA05).
- 4 . Unscrew AS3 × 6 (n = 2) to disconnect the ground cables of the base board (18536-BA05) and primary unit (15601-EA01).



- 5 . Unscrew BS3 × 8 (n = 3) to replace the inlet ASSY (18536-1100).
- 6 . Reassemble the parts in the reverse order.

 Caution	Confirm that the ground cable is reconnected to the base board (18536-BA05).
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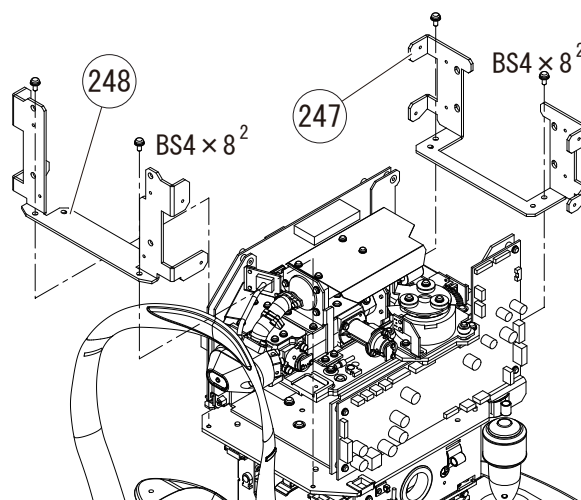


7.1.3 Body ASSY

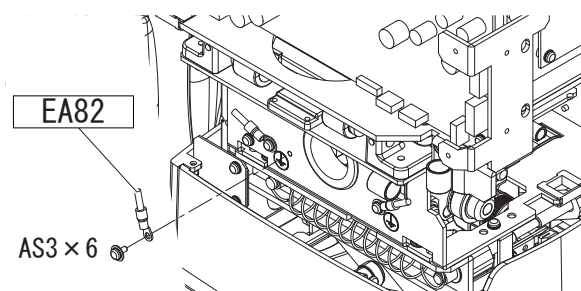
7.1.3.1 NT-510 body ASSY (18536-2000)

Replacement part: 18536-2000

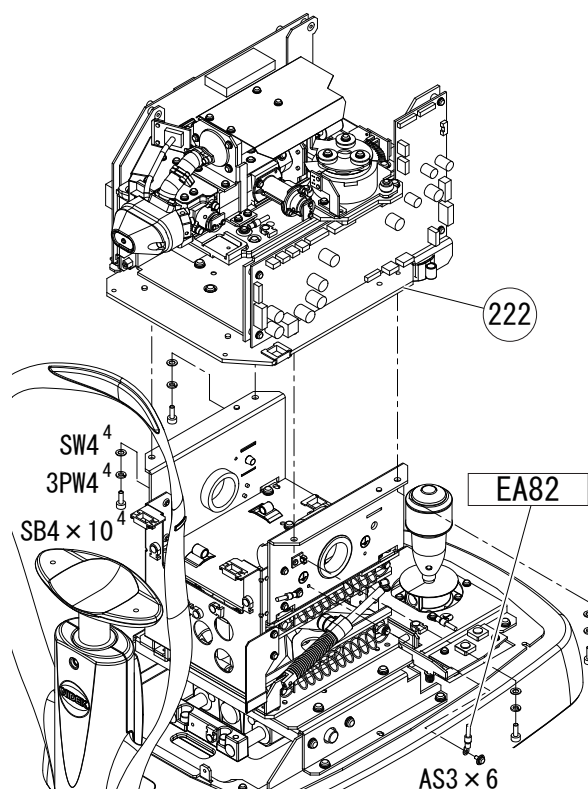
- 1 . Remove the body cover ASSY (18536-7000) ([see 6.6 \[p70\]](#)).
- 2 . Unscrew BS4 × 8 (n = 4) to remove the rear cover bracket (18536-M247) and front cover bracket (18536-M248).
- 3 . Disconnect P302 (J2), P312 (J12), P315 (J15), P318 (J18), and P319 (J19) on the driver board (18536-BA03).
- 4 . Disconnect P103 (J3) on the main board (18536-BA01).



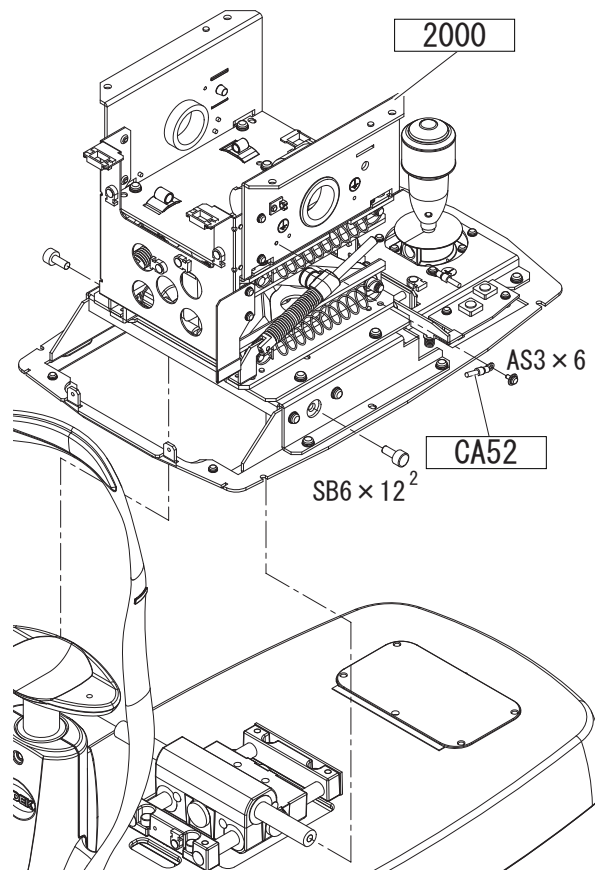
- 5 . Unscrew AS3 × 6 to disconnect the F.GND3 cable (30601-EA82).



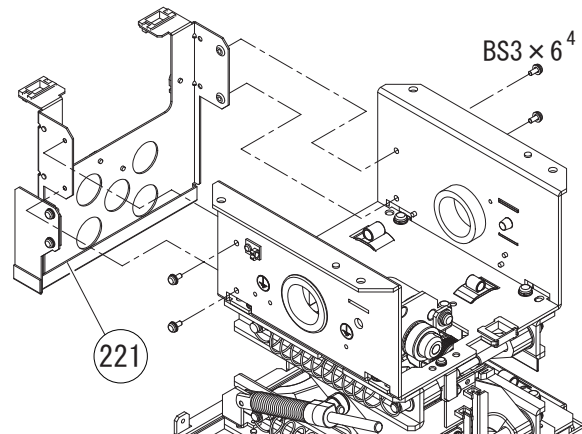
- 6 . Unscrew SB4 × 10 (n = 4), 3PW4 (n = 4), and SW4 (n = 4) to remove the adjusted NT measuring ASSY along with the measuring unit base (18536-M222).



- 7 . Unscrew AS3 × 6 to disconnect the ground cable of the base cable (18536-CA52).
- 8 . Unscrew SB6 × 12 (n = 2) to remove the NT-510 body ASSY (18536-2000).



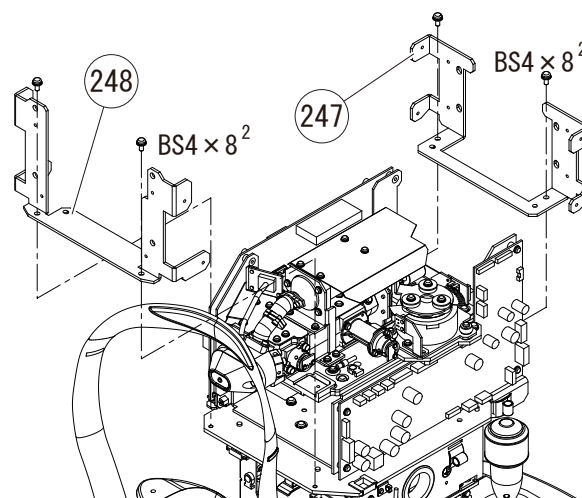
- 9 . Unscrew BS3 × 6 (n = 4) to remove the guide plate (18531-M221). Then, replace the NT-510 body ASSY (18536-2000).
- 10 . Reassemble the parts in the reverse order.
- 11 . Perform the following.
 - 1) AUTO TRC ADJUST (See 8.5.2 [p190].)
 - 2) TRC LIMIT ADJUST (See 8.5.3 [p191].)



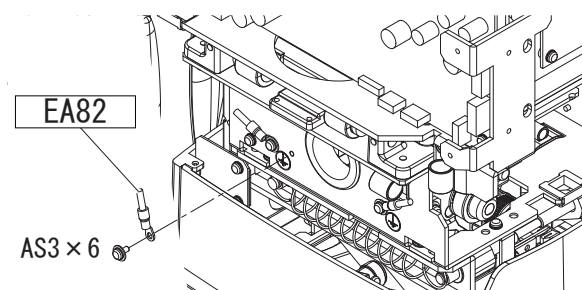
7.1.3.2 NT-530 body ASSY (18537-2000)

Replacement part: 18537-2000

- 1 . Remove the body cover ASSY (18536-7000) (see 6.6 [p70]).
- 2 . Unscrew BS4 × 8 (n = 4) to remove the rear cover bracket (18536-M247) and front cover bracket (18536-M248).
- 3 . Disconnect P302 (J2), P312 (J12), P315 (J15), P318 (J18), and P319 (J19) on the driver board (18536-BA03).
- 4 . Disconnect P103 (J3) on the main board (18536-BA01).

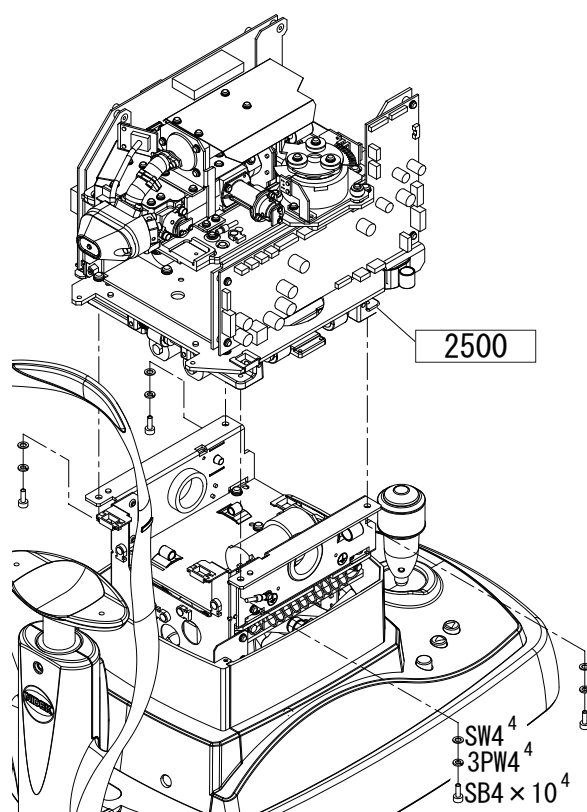


- 5 . Unscrew AS3 × 6 to disconnect the F.GND3 cable (30601-EA82).

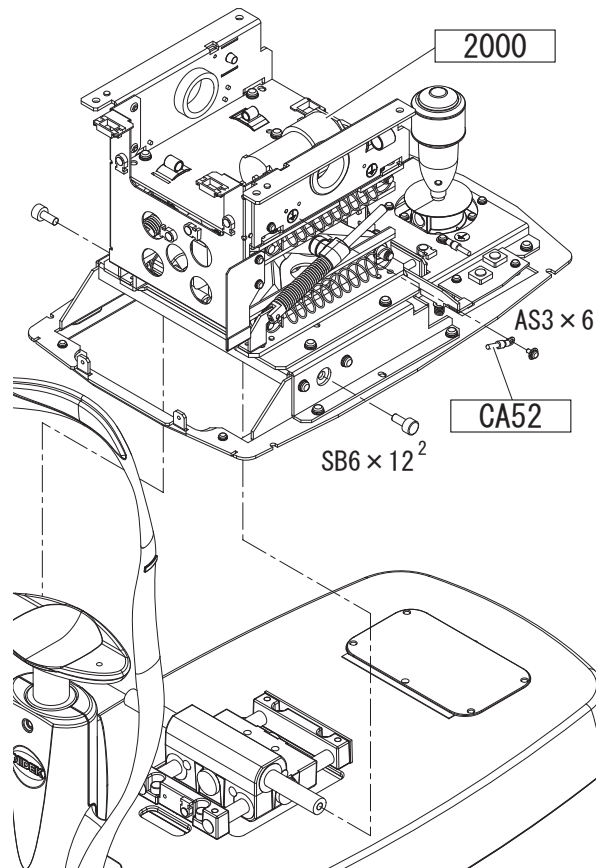


- 6 . Unscrew SB4 × 10 (n = 4), 3PW4 (n = 4), and SW4 (n = 4) to remove the horizontal tracking ASSY (18537-2500) along with the following unit.

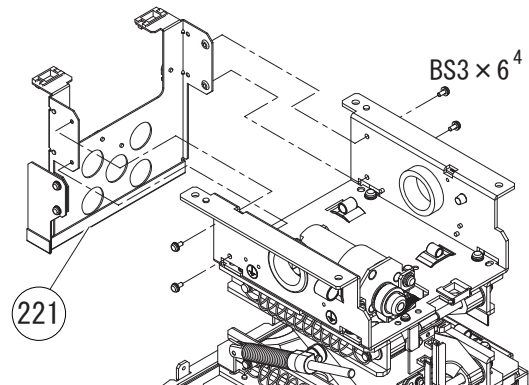
- 1) NT-530: Adjusted NT measuring ASSY (18536-9100)
- 2) NT-530P: Adjusted NT measuring ASSY (18538-9100)



- 7 . Unscrew AS3 × 6 to disconnect the ground cable of the base cable (18536-CA52).
- 8 . Unscrew SB6 × 12 (n = 2) to remove the NT-530 body ASSY (18537-2000).



- 9 . Unscrew BS3 × 6 (n = 4) to remove the guide plate (18531-M221). Then, replace the NT-530 body ASSY (18537-2000).
- 10 . Reassemble the parts in the reverse order.
- 11 . Perform the following.
 - 1) AUTO TRC ADJUST (See 8.5.2 [p190].)
 - 2) TRC LIMIT ADJUST (See 8.5.3 [p191].)



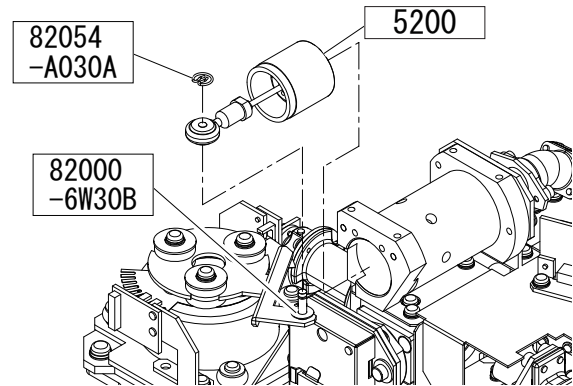
7.1.4 Piston ASSY (18536-5200)

Replacement part: 18536-5200

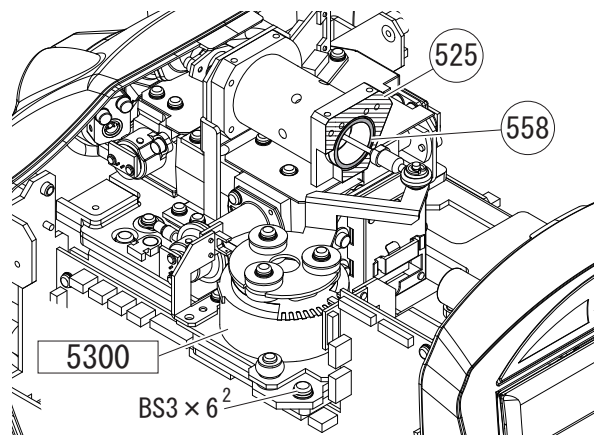
- 1 . Remove the following dust cover (see 6.9 [p72]).
 - 1) NT-510/NT-530: NT-510/NT-530 dust cover (15601-M554) (See 6.9.1 [p72].)
 - 2) NT-530P: NT-530P dust cover (18538-M354) (See 6.9.2 [p72].)
- 2 . Remove the clip ring (82054-A030A).
- 3 . Remove the rod end (18536-M561) from the shaft (18536-M523).

⚠ Caution	Be careful not to drop the nylon washer (82000-6W30B).
-----------	--

- 4 . Replace the piston ASSY (18536-5200).
- 5 . Reassemble the parts in the reverse order.



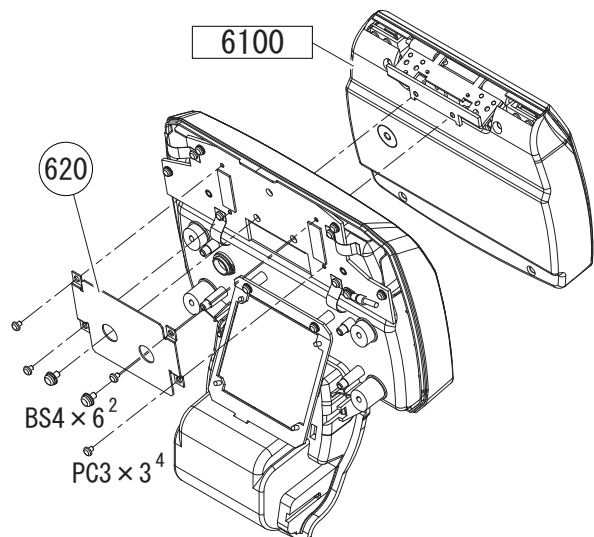
- 6 . Loosen BS3 × 6 (n = 2) to adjust the position of the solenoid ASSY so that the end of the piston (18536-M558) is aligned to that of the cylinder joint (15601-M525).
- 7 . Perform the following.
 - 1) Solenoid brake (See 8.3.8 [p146].)
 - 2) Puffed air pressure (See 8.3.9 [p147].)
 - 3) Model eye measurements (See 8.3.13 [p151].)



7.1.5 LCD ASSY (18536-6100)

Replacement part: 18536-6100

- 1 . Remove the measuring unit rear cover ASSY (18536-6000) (see 6.3 [p68]).
- 2 . Unscrew PC3 × 3 (n = 4) to remove the cable clamp (18536-M620).
- 3 . Unscrew BS4 × 6 (n = 2) to replace the LCD ASSY (18536-6100).
- 4 . Reassemble the parts in the reverse order.

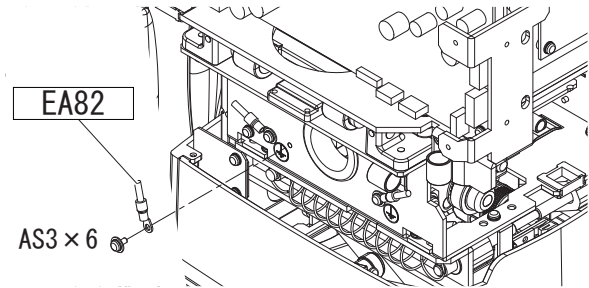


7.1.6 Adjusted NT measuring ASSY

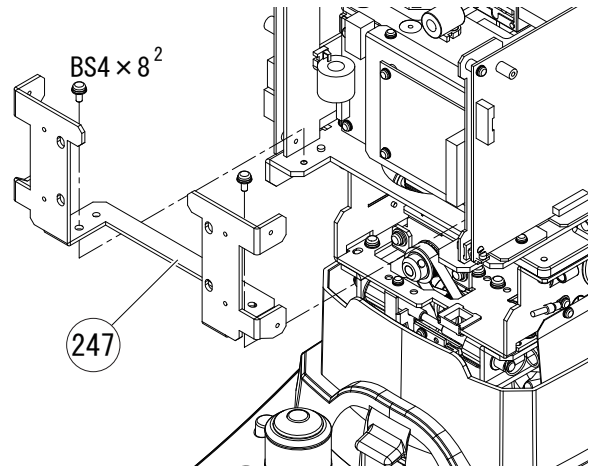
7.1.6.1 NT-510/NT-530 adjusted NT measuring ASSY (18536-9100)

Replacement part: 18536-9100

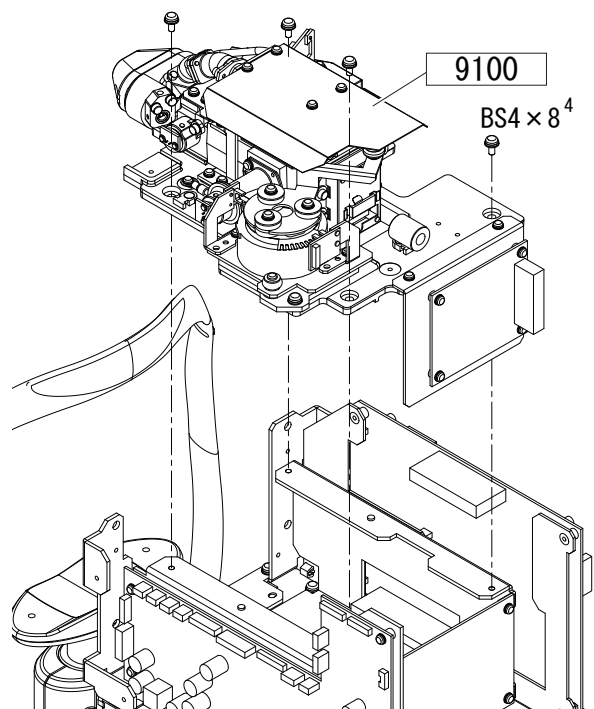
- 1 . Remove the following measuring unit front cover ASSY.
 - 1) NT-510/530P: NT-510/NT-530 measuring unit front cover ASSY (18536-6300) (See 6.4.1 [p69].)
 - 2) NT-530P: NT-510/NT-530 measuring unit front cover ASSY (18536-6300) (See 6.4.1 [p69].)
- 2 . Remove the measuring unit rear cover ASSY (18536-6000) (see 6.3 [p68]).
- 3 . Unscrew AS3 × 6 to disconnect the F.GND3 cable (30601-EA82).



- 4 . Unscrew BS4 × 8 (n = 2) to remove the rear cover bracket (18536-M247).
- 5 . Disconnect P305 (J5), P306 (J6), P307 (J7), P308 (J8), P322 (J22), and P323 (J23) on the driver board (18536-BA03).
- 6 . Disconnect P2002 (J2) on the solenoid board (18536-BA20).
- 7 . Disconnect P104 (J4) on the main board (18536-BA01).

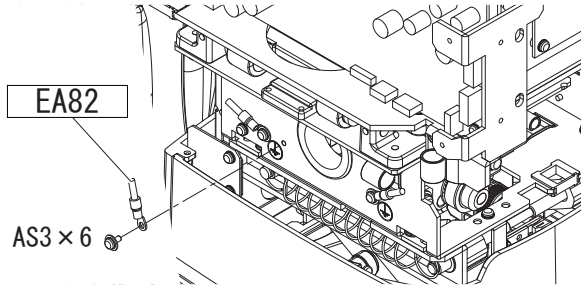
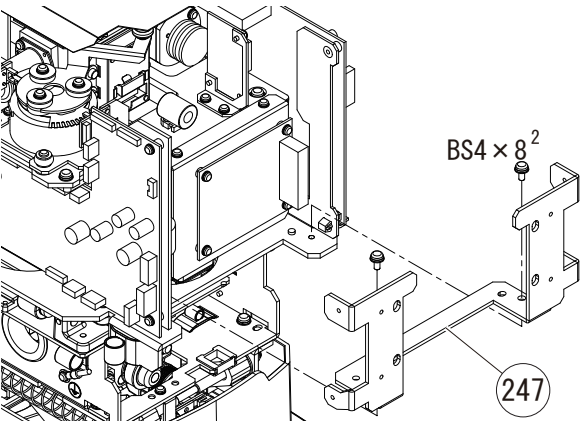
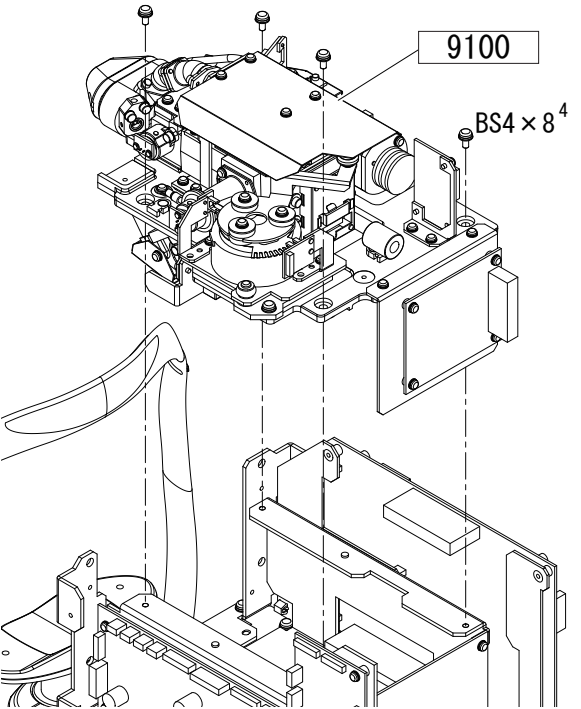


- 8 . Unscrew BS4 × 8 (n = 4) to replace the adjusted NT measuring ASSY (18536-9100).
- 9 . Reassemble the parts in the reverse order.
- 10 . Perform the following.
 - 1) Settings After Replacement of Measuring Unit (See 8.6 [p193].)
 - 2) Model eye measurements (See 8.3.13 [p151].)




7.1.6.2 NT-530P adjusted NT measuring ASSY (18538-9100)

Replacement part: 18538-9100

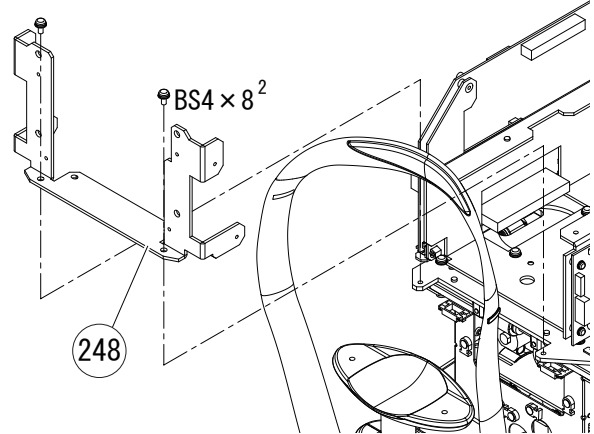
- 1 . Remove the following measuring unit front cover ASSY.
 - 1) NT-510/530P: NT-510/NT-530 measuring unit front cover ASSY (18536-6300) ([See 6.4.1 \[p69\].](#))
 - 2) NT-530P: NT-510/NT-530 measuring unit front cover ASSY (18536-6300) ([See 6.4.1 \[p69\].](#))
 - 2 . Remove the measuring unit rear cover ASSY (18536-6000) ([see 6.3 \[p68\]](#)).
 - 3 . Unscrew AS3 × 6 to disconnect the F.GND3 cable (30601-EA82).
- 
- 4 . Unscrew BS4 × 8 (n = 2) to remove the rear cover bracket (18536-M247).
 - 5 . Disconnect P305 (J5), P306 (J6), P307 (J7), P308 (J8), P322 (J22), and P323 (J23) on the driver board (18536-BA03).
- 
- 6 . Disconnect P2601 (J1) on the pachy board (18538-BA26).
 - 7 . Disconnect P2002 (J2) on the solenoid board (18536-BA20).
 - 8 . Disconnect P104 (J4) and P107 (J7) on the main board (18538-BA01P).
 - 9 . Unscrew BS4 × 8 (n = 4) to replace the adjusted NT measuring ASSY (18538-9100).
 - 10 . Reassemble the parts in the reverse order.
 - 11 . Perform the following.
 - 1) Settings After Replacement of Measuring Unit ([See 8.6 \[p193\].](#))
 - 2) Pachy calibration ([See 8.4.3 \[p168\].](#))
 - 3) Model eye measurements ([See 8.3.13 \[p151\].](#))
- 

7.1.7 Horizontal tracking ASSY (18537-2500)

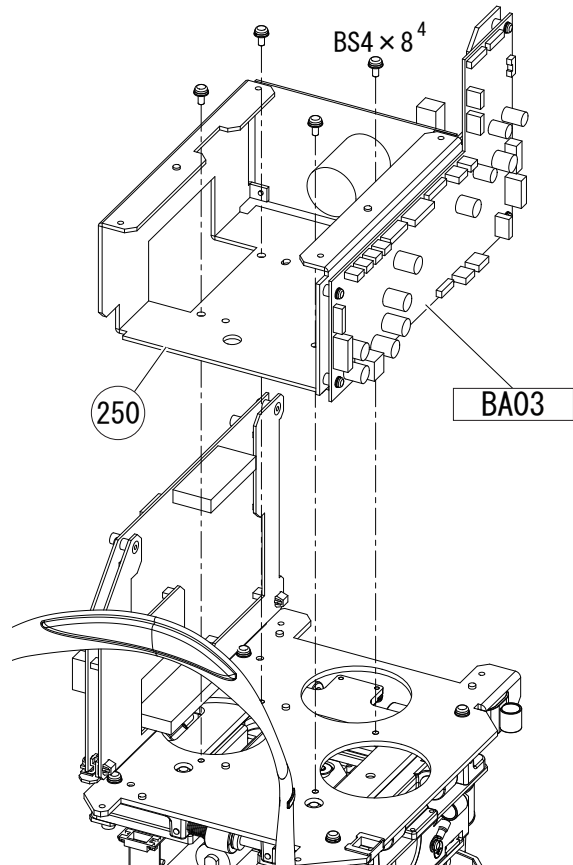
Replacement part: 18537-2500

 **Caution** NT-530/NT-530P only

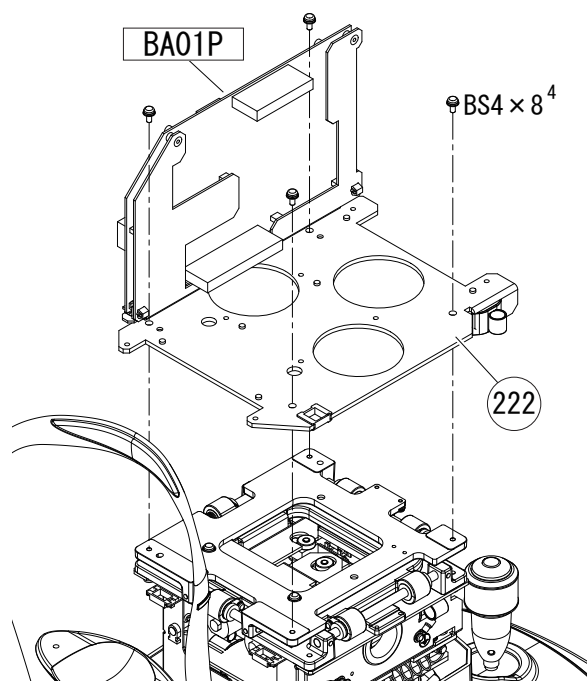
- 1 . Remove the following adjusted NT measuring ASSY.
 - 1) NT-530: NT-510/NT-530 adjusted NT measuring ASSY (18536-9100) ([See 7.1.6.1 \[p84\].](#))
 - 2) NT-530P: NT-530P adjusted NT measuring ASSY (18538-9100) ([See 7.1.6.2 \[p85\].](#))
- 2 . Unscrew BS4 × 8 (n = 2) to remove the front cover bracket (18536-M248).
- 3 . Disconnect all connectors (excluding P320 [J20]) on the driver board (18536-BA03).



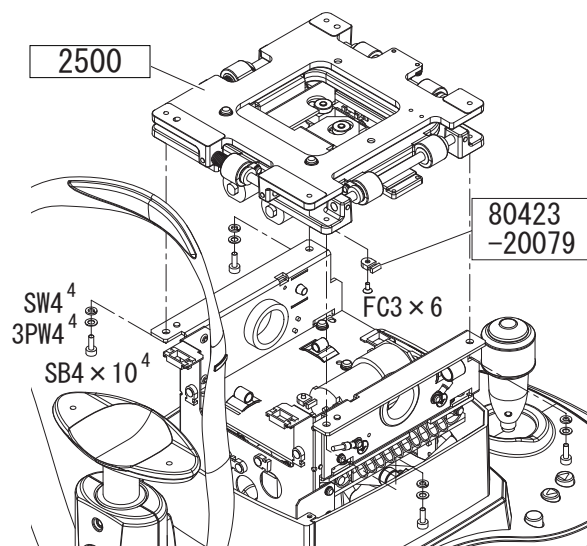
- 4 . Unscrew BS4 × 8 (n = 4) to remove the spacer (18536-M250).
- 5 . Disconnect all connectors on the following main board.
 - 1) NT-530: 18537-BA01P
 - 2) NT-530P: 18538-BA01P



- 6 . Unscrew BS4 × 8 (n = 4) to remove the measuring unit base (18537-M222) along with the main board.




- 7 . Unscrew SB4 × 10 (n = 4), 3PW4 (n = 4), and SW4 (n = 4) to replace the horizontal tracking ASSY (18537-2500).
- 8 . Unscrew FC3 × 6 to remove the cable tie mount (80423-20079).
- 9 . Reassemble the parts in the reverse order.
- 10 . Perform TRC LIMIT ADJUST ([see 8.5.3 \[p191\]](#)).

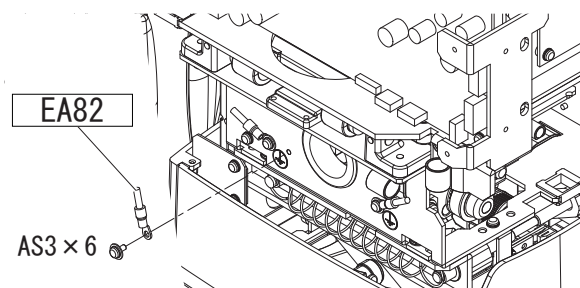


7.1.8 R/L motor ASSY (18537-2510)

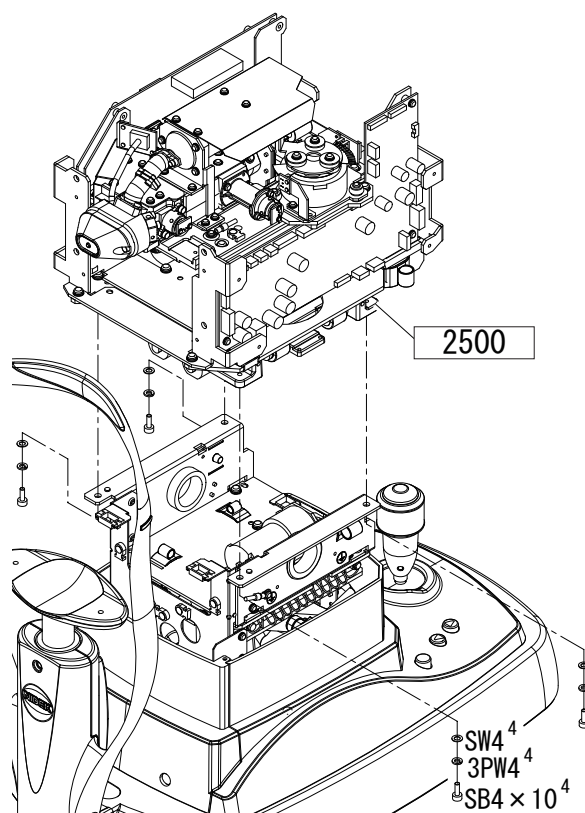
Replacement part: 18537-2510

 **Caution** NT-530/NT-530P only

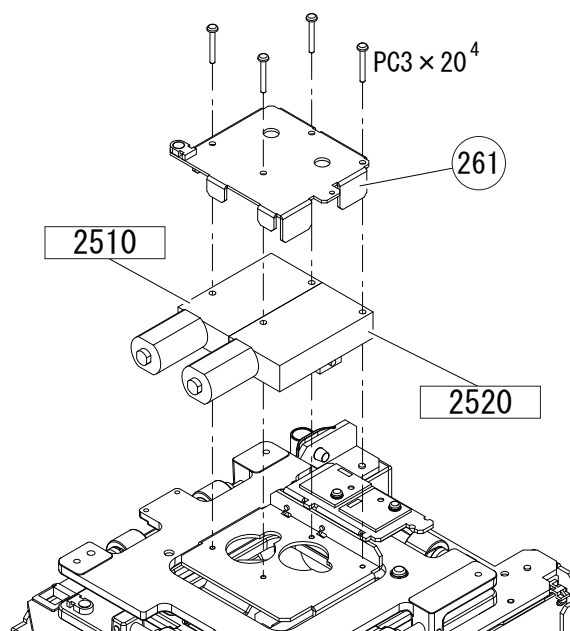
- 1 . Remove the following measuring unit front cover ASSY.
 - 1) NT-510/530P: NT-510/NT-530 measuring unit front cover ASSY (18536-6300) (See 6.4.1 [p69].)
 - 2) NT-530P: NT-510/NT-530 measuring unit front cover ASSY (18536-6300) (See 6.4.1 [p69].)
- 2 . Remove the measuring unit rear cover ASSY (18536-6000) (see 6.3 [p68]).
- 3 . Disconnect P103 (J3) on the following main board.
 - 1) NT-510: 18536-BA01P
 - 2) NT-530: 18537-BA01P
 - 3) NT-530P: 18538-BA01P
- 4 . Disconnect P302 (J2), P318 (J18), and P319 (J19) on the driver board (18536-BA03).
- 5 . Unscrew AS3 × 6 to disconnect the F.GND3 cable (30601-EA82).



- 6 . Unscrew SB4 × 10 (n = 4), 3PW4 (n = 4), and SW4 (n = 4) to remove the horizontal tracking ASSY (18537-2500) along with the adjusted NT measuring ASSY.




- 7 . Unscrew PC3 × 20 (n = 4) to remove the motor plate (15601-M261).
- 8 . Replace the R/L motor ASSY (18537-2510).
- 9 . Reassemble the parts in the reverse order.



7.1.9 F/B motor ASSY (18537-2520)

Replacement part: 18537-2520

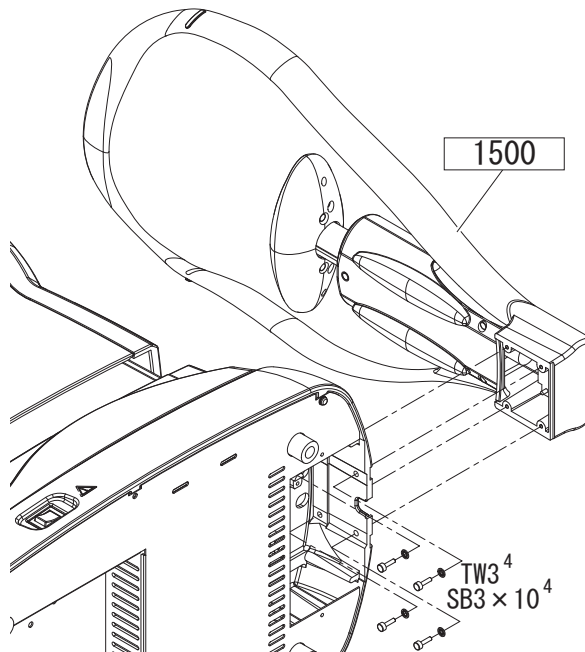
 **Caution** NT-530/NT-530P only

- 1 . Unscrew SB4 × 10 (n = 4), 3PW4 (n = 4), and SW4 (n = 4) to remove the horizontal tracking ASSY (18537-2500) along with the adjusted NT measuring ASSY ([see 7.1.8 \[p88\]](#)).
- 2 . Disconnect P310 (J10) on the driver board (18536-BA03).
- 3 . Remove the motor plate (18537-M261) ([see 7.1.8 \[p88\]](#)).
- 4 . Replace the F/B motor ASSY (18537-2520) ([see 7.1.8 \[p88\]](#)).
- 5 . Reassemble the parts in the reverse order.

7.1.10 Chinrest ASSY (15601-1500)

Replacement part: 15601-1500

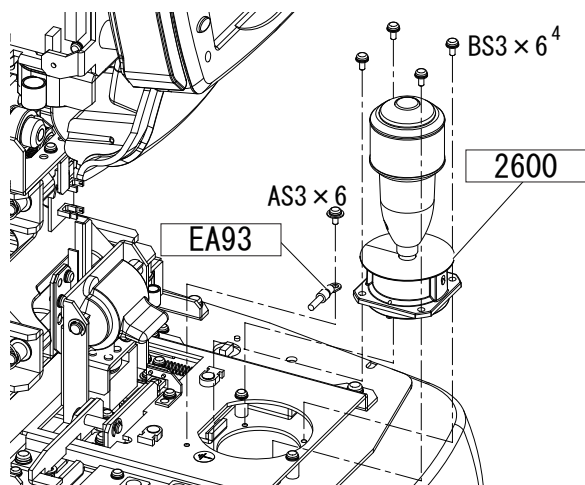
- 1 . Remove the lid (30601-M003) ([see 6.7 \[p71\]](#)).
- 2 . Disconnect P004 of the chinrest cable (15601-EA54) and J004 of the chinrest (15601-EA53).
- 3 . Unscrew SB3 × 10 (n = 4) and TW3 (n = 4) to replace the chinrest ASSY (15601-1500).
- 4 . Reassemble the parts in the reverse order.



7.1.11 Joystick ASSY (30601-2600)

Replacement part: 30601-2600


- 1 . Remove the body cover ASSY (18536-7000) ([see 6.6 \[p70\]](#)).
- 2 . Disconnect P902 (J2) on the U/D SW board (30601-BA09).
- 3 . Unscrew AS3 × 6 to disconnect the ground cable (30601-EA93) from the joystick ASSY (30601-2600).
- 4 . Unscrew BS3 × 6 (n = 4) to replace the joystick ASSY (30601-2600).
- 5 . Reassemble the parts in the reverse order.
- 6 . Check each button in maintenance mode ([see 8.1.4 \[p122\]](#)).

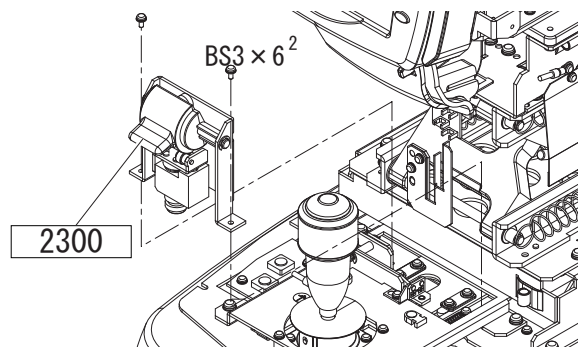


7.1.12 Brake ASSY (30601-2300)

Replacement part: 30601-2300

- 1 . Remove the body cover ASSY (18536-7000) (see 6.6 [p70]).
- 2 . Unscrew BS3 × 6 (n = 2) to replace the brake ASSY (30601-2300).
- 3 . Reassemble the parts in the reverse order.

 Note	Ensure that the main unit cannot be moved to the right and left or forward and backward when locked.
--	--

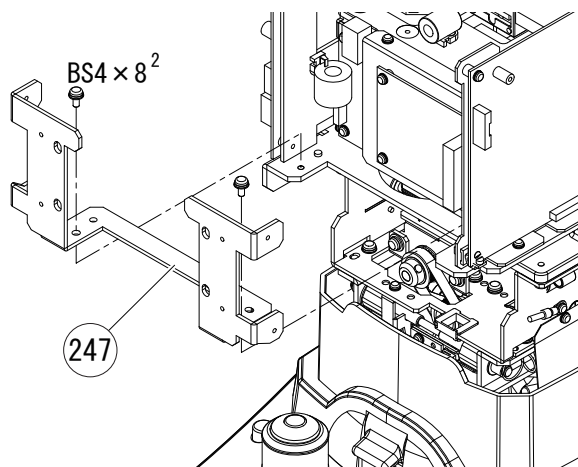


7.1.13 Pachy photodetector ASSY (18538-3200)

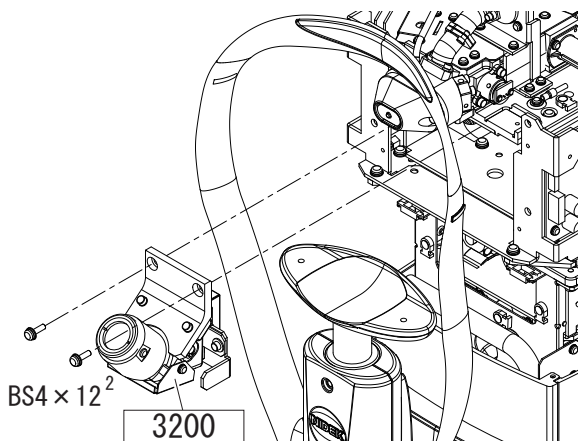
Replacement part: 18538-3200

 Caution NT-530P only

- 1 . Remove the measuring unit rear cover ASSY (18536-6000) (see 6.3 [p68]).
- 2 . Remove the rear cover bracket (18536-M247).
- 3 . Disconnect P104 (J4) on the main board (18538-BA01P).



- 4 . Unscrew BS4 × 12 (n = 2) to replace the pachy photodetector ASSY (18538-3200).
- 5 . Reassemble the parts in the reverse order.
- 6 . Perform the following.
 - 1) Pachy photodetector ASSY (See 8.4.2 [p163].)
 - 2) Pachy calibration (See 8.4.3 [p168].)



7.2 Boards

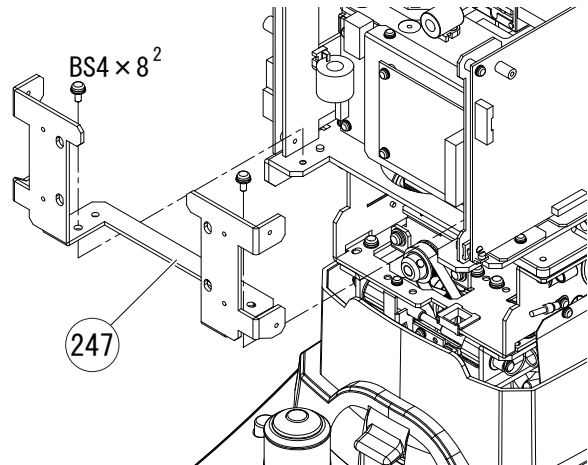
7.2.1 Main board

Replacement part: 18536-BA01P (for NT-510)

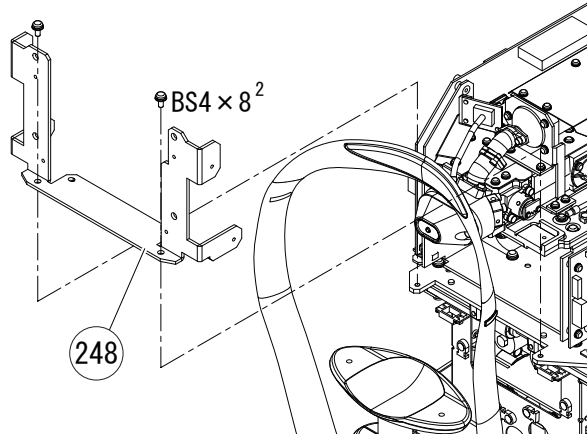
18537-BA01P (for NT-530)

18538-BA01P (for NT-530P)

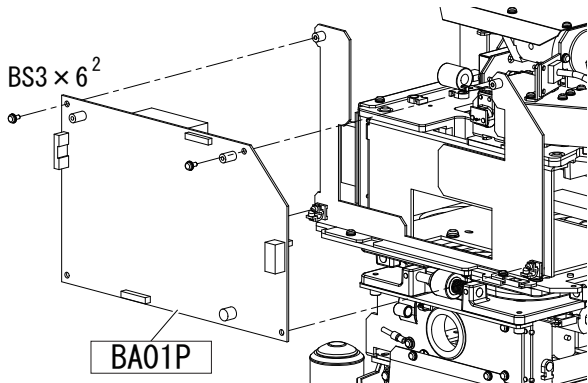
- 1 . Remove the measuring unit rear cover ASSY (18536-6000) (see 6.3 [p68]).
- 2 . Remove the following measuring unit front cover ASSY.
 - 1) NT-510/NT-530: NT-510/NT-530 measuring unit front cover ASSY (18536-6300) (See 6.4.1 [p69].)
 - 2) NT-530P: NT-530P measuring unit front cover ASSY (18538-6300) (See 6.4.2 [p69].)
- 3 . Unscrew BS4 × 8 (n = 2) to remove the rear cover bracket (18536-M247).



- 4 . Unscrew BS4 × 8 (n = 2) to remove the front cover bracket (18536-M248).
- 5 . Disconnect all connectors on the main board (18536-BA01).



- 6 . Unscrew BS3 × 6 (n = 2) to replace the following main board.
 - 1) NT-510: 18536-BA01P
 - 2) NT-530: 18537-BA01P
 - 3) NT-530P: 18538-BA01P
- 7 . Reassemble the parts in the reverse order.
- 8 . Perform the following.
 - 1) EEPROM Backup (See 8.8 [p198].)
 - 2) BACKUP (See 8.10.1 [p200].)

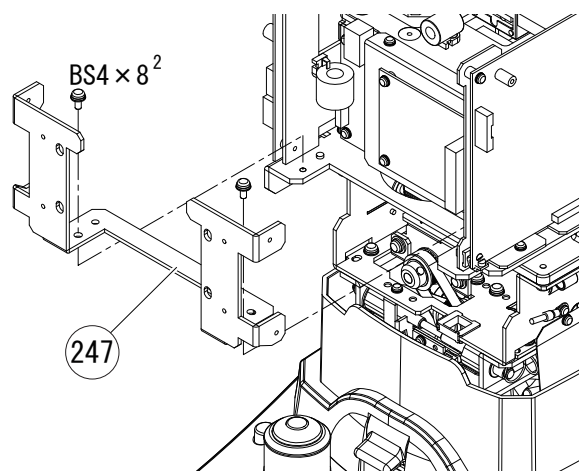
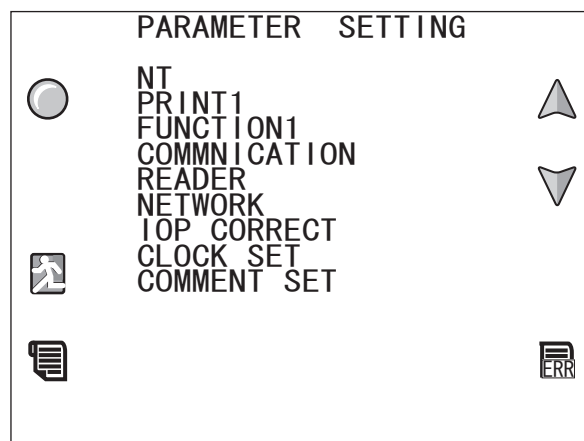


Only devices with V1.06 and later installed can be backed up.

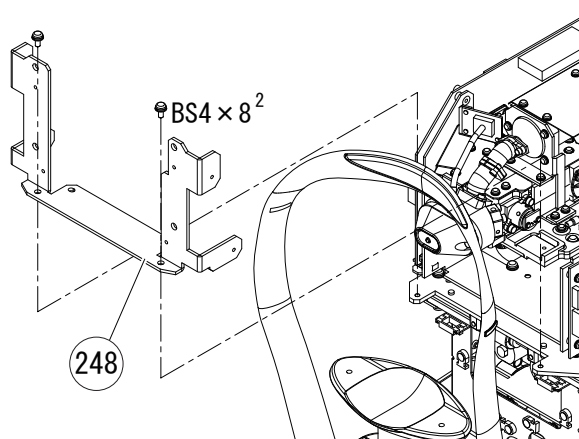
7.2.2 Driver board (18536-BA03)

Replacement part: 18536-BA03

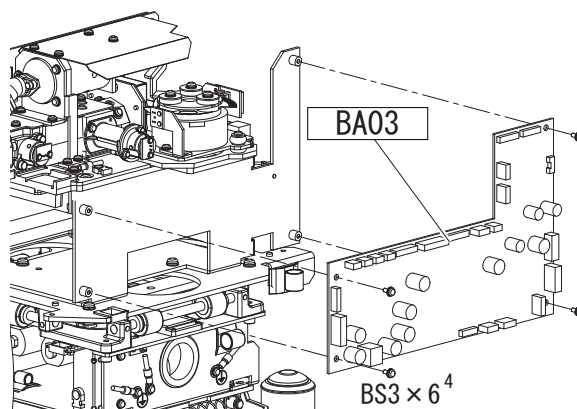
- 1 . Print out the settings of the devices installed with V1.05 or earlier only by the following procedure.
 - 1) Display the PARAMETER SETTING screen (see 8.1.6 [p125]).
 - 2) Press the print button to print the device settings.
- 2 . Remove the measuring unit rear cover ASSY (18536-6000) (see 6.3 [p68]).
- 3 . Remove the following measuring unit front cover ASSY.
 - 1) NT-510/NT-530: NT-510/NT-530 measuring unit front cover ASSY (18536-6300) (See 6.4.1 [p69].)
 - 2) NT-530P: NT-530P measuring unit front cover ASSY (18538-6300) (See 6.4.2 [p69].)
- 4 . Unscrew BS4 × 8 (n = 2) to remove the rear cover bracket (18536-M247).




- 5 . Unscrew BS4 × 8 (n = 2) to remove the front cover bracket (18536-M248).




- 6 . Disconnect all connectors on the driver board (18536-BA03).
- 7 . Unscrew BS3 × 6 (n = 4) to replace the driver board (18536-BA03).
- 8 . Reassemble the parts in the reverse order.
- 9 . Turning on power after replacement displays the following errors.
 - 1) NT-510: ERR075
 - 2) NT-530: ERR075
 - 3) NT-530P: ERR076



 Caution	<p>Do not turn off power until the error is displayed.</p> <p>If the model of the replaced driver board (30611-BA03) does not match that of the device, ERR072 to ERR074 occur and the device does not start.</p>
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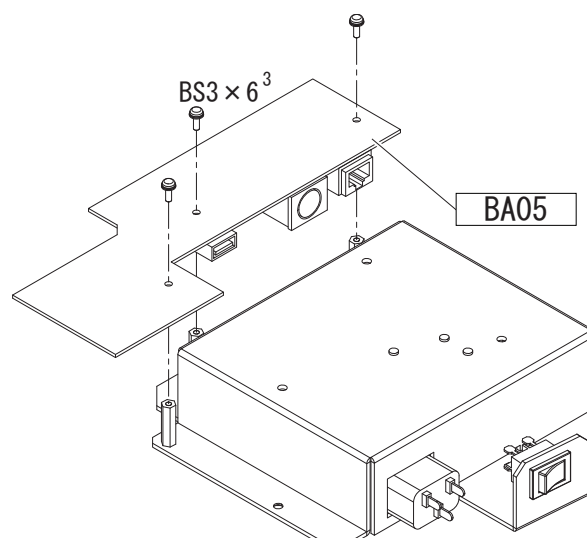
10. Turn off and on the power.
11. Perform the following.
 - 1) Restoring EEPROM Data ([See 8.9 \[p199\].](#))
12. Set the parameters by the following procedure.
 - 1) For devices with V1.05 or earlier installed, set the parameters using the following procedure.
 - a . Display the PARAMETER SETTING screen ([see 8.1.6 \[p125\]](#)).
 - b . Set the parameters of the devices to the original settings that were printed out earlier. ([see 8.1.6 \[p125\]](#)).
 - 2) For devices with V1.06 or later installed, perform the following task.
 - a . RESTORE ([See 8.10.2 \[p201\].](#)).

 Note	<p>Performing “RESTORE” will back up the changed parameters to the main board.</p>
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7.2.3 Base board (18536-BA05)

Replacement part: 18536-BA05

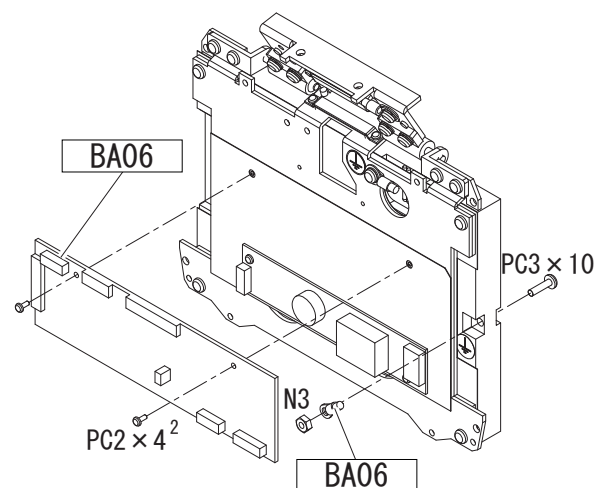
- 1 . Remove the inlet ASSY (15601-1100) ([see 7.1.2 \[p78\]](#)).
- 2 . Disconnect all connectors on the base board (15601-BA05).
- 3 . Unscrew BS3 × 8 (n = 4) to replace the base board (15536-BA05).
- 4 . Reassemble the parts in the reverse order.



7.2.4 LCD board (18536-BA06)

Replacement part: 18536-BA06

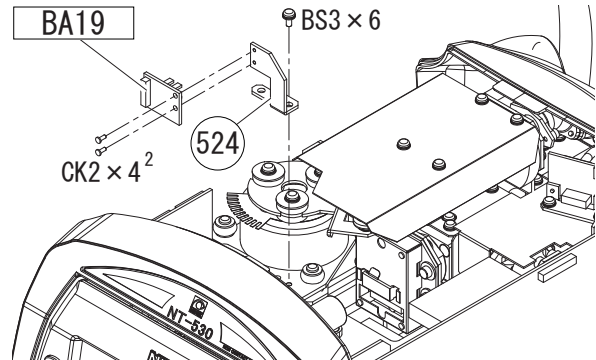
- 1 . Remove the LCD front cover (30601-M716) ([see 6.13 \[p75\]](#)).
- 2 . Disconnect all connectors on the LCD board (18536-BA06).
- 3 . Unscrew PC3 × 10 and N3 to disconnect the ground cable of the LCD board (18536-BA06).
- 4 . Unscrew PC2 × 4 (n = 2) to replace the LCD board (18536-BA06).
- 5 . Reassemble the parts in the reverse order.



7.2.5 SLPOS encoder board (18536-BA19)

Replacement part: 18536-BA19

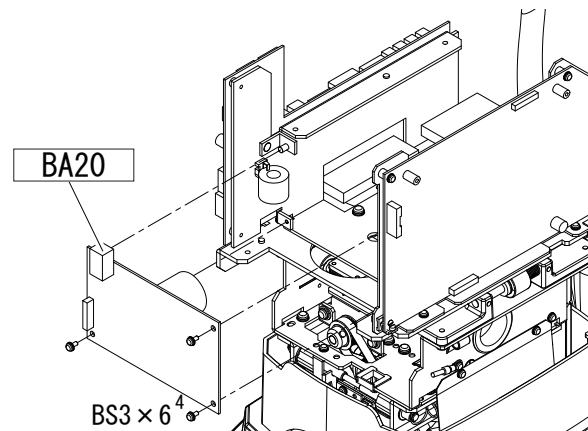
- 1 . Remove the measuring unit left cover (18536-M707) ([see 6.1 \[p67\]](#)).
- 2 . Remove the measuring unit right cover (18536-M708) ([see 6.2 \[p67\]](#)).
- 3 . Disconnect P1901 (J1) on the SLPOS encoder board (18536-BA19).
- 4 . Unscrew BS3 × 6 to remove the SLPOS encoder board (18536-BA19) along with the sensor plate (18536-M524).
- 5 . Unscrew CK2 × 4 (n = 2) to replace the SLPOS encoder board (18536-BA19).
- 6 . Reassemble the parts in the reverse order.



7.2.6 Solenoid board (18536-BA20)

Replacement part: 18536-BA20

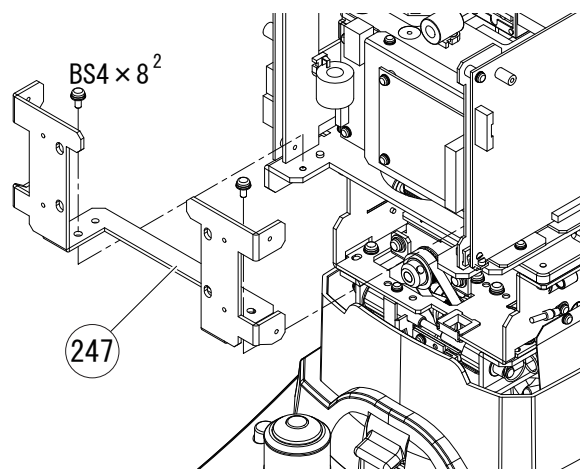
- 1 . Remove the adjusted NT measuring ASSY (18536-9100) ([see 7.1.6.1 \[p84\]](#)).
- 2 . Disconnect P2001 (J1) on the solenoid board (18536-BA20).
- 3 . Unscrew BS3 × 6 (n = 4) to replace the solenoid board (18536-BA20).
- 4 . Reassemble the parts in the reverse order.
- 5 . Perform the following.
 - 1) Solenoid brake ([See 8.3.8 \[p146\]](#).)
 - 2) Puffed air pressure ([See 8.3.9 \[p147\]](#).)
 - 3) Model eye measurements ([See 8.3.13 \[p151\]](#).)
 - 4) A/B constant ([See 8.3.14 \[p154\]](#).)



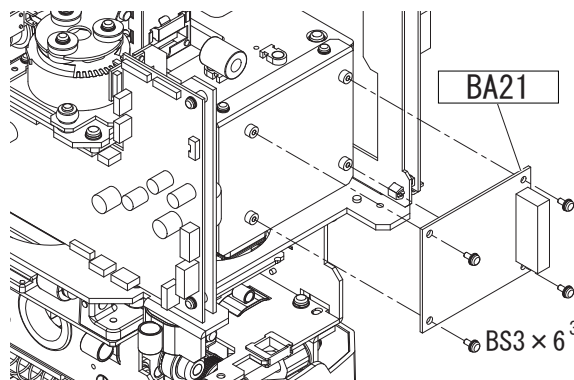
7.2.7 NT board (18536-BA21)

Replacement part: 18536-BA21

- 1 . Remove the measuring unit rear cover ASSY (18536-6000) ([see 6.3 \[p68\]](#)).
- 2 . Remove the measuring unit front cover ASSY (18536-6300) ([see 6.4 \[p69\]](#)).
- 3 . Unscrew BS4 × 8 (n = 2) to remove the rear cover bracket (18536-M247).
- 4 . Disconnect all connectors on the NT board (18536-BA21).

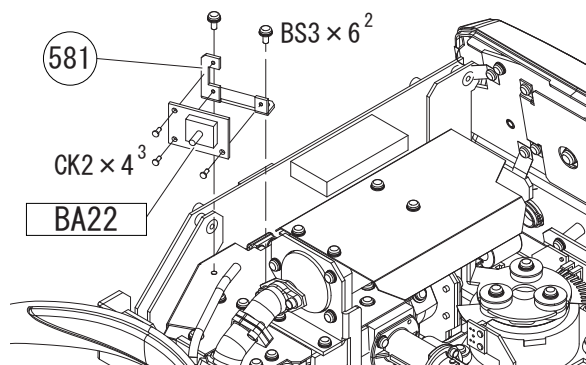


- 5 . Unscrew BS3 × 6 (n = 4) to replace the NT board (18536-BA21).
- 6 . Reassemble the parts in the reverse order.
- 7 . Perform [NT board adjustment](#) ([see 8.3.6 \[p141\]](#)).



7.2.8 Pressure sensor board (18536-BA22)

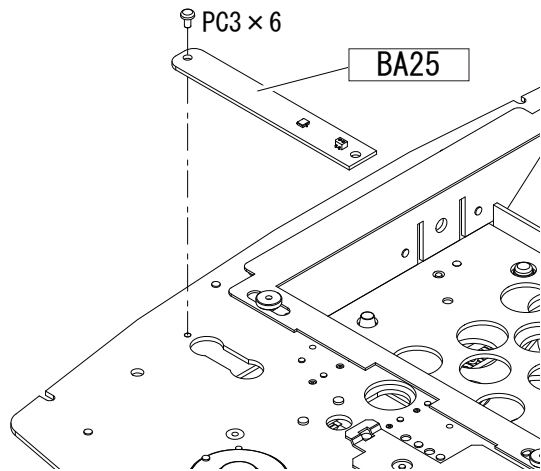
- 1 . Remove the measuring unit left cover (18536-M707) ([see 6.1 \[p67\]](#)).
- 2 . Remove the measuring unit right cover (18536-M708) ([see 6.2 \[p67\]](#)).
- 3 . Remove the silicon tube (15601-M533) from the pressure sensor board (18536-BA22).
- 4 . Disconnect P2201 (J1) on the pressure sensor board (18536-BA22).
- 5 . Unscrew BS3 × 6 (n = 2) to remove the BA26 attachment plate (18536-M581).
- 6 . Unscrew CK2 × 4 (n = 3) to replace the pressure sensor board (18536-BA22).
- 7 . Reassemble the parts in the reverse order.
- 8 . Perform the following.
 - 1) Puffed air pressure ([See 8.3.9 \[p147\]](#).)
 - 2) Model eye measurements ([See 8.3.13 \[p151\]](#).)



7.2.9 Front/RL sensor board (18536-BA25)

Replacement part: 18536-BA25

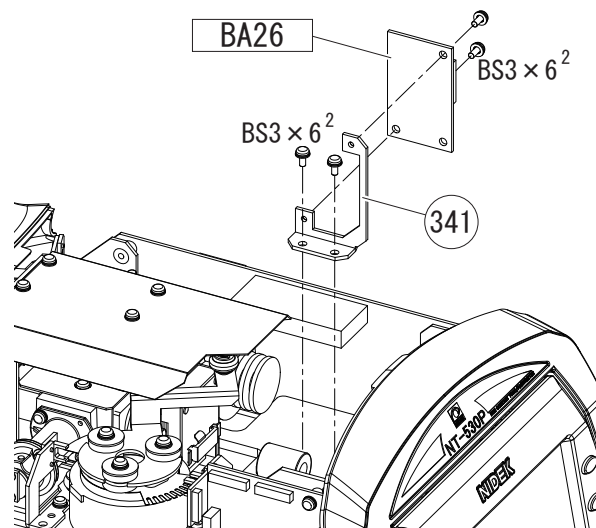
- 1 . Disconnect P103 (J3) on the following main board.
 - 1) NT-510: 18536-BA01P
 - 2) NT-530: 18537-BA01P
 - 3) NT-530P: 18538-BA01P
- 2 . Disconnect P302 (J2) on the driver board (18536-BA03).
- 3 . Unscrew AS3 × 6 to disconnect the ground cable of the base cable (18536-CA52) connected to the body ASSY (see 7.1.3 [p79]).
- 4 . Remove the base ASSY (18536-1000) along with the chinrest ASSY (15601-1500) (see 7.1.1 [p77]).
- 5 . Disconnect P2501 (J1) on the front/RL sensor board (18536-BA25)
- 6 . Unscrew PC3 × 6 to replace the front R/L sensor board (18536-BA25).
- 7 . Reassemble the parts in the reverse order.



7.2.10 Pachy board (18538-BA26)

Replacement part: 18538-BA26

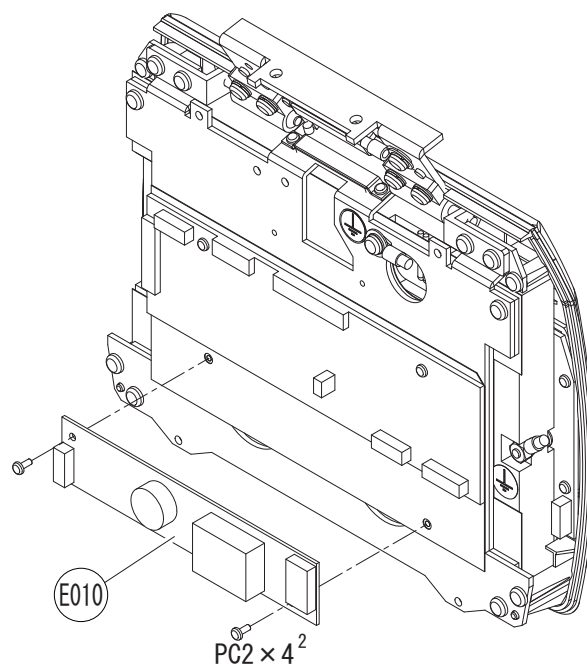
- 1 . Remove the measuring unit left cover (18536-M707) (see 6.1 [p67]).
- 2 . Remove the measuring unit right cover (18536-M708) (see 6.2 [p67]).
- 3 . Disconnect all connectors on the pachy board (18538-BA26).
- 4 . Unscrew BS3 × 6 (n = 2) to remove the pachy board (18538-BA26) along with the BA26 attachment plate (18536-M341).
- 5 . Unscrew BS3 × 6 (n = 2) to replace the pachy board (18538-BA26).
- 6 . Reassemble the parts in the reverse order.



7.2.11 DC-AC inverter (18535-E010)

Replacement part: 18535-E010

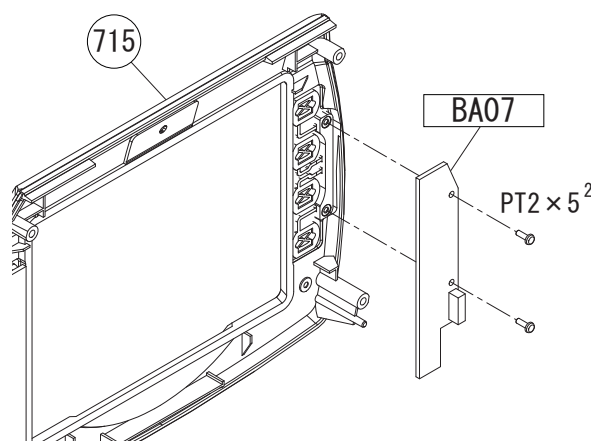
- 1 . Remove the LCD rear cover (30601-M716) ([see 6.12 \[p74\]](#)).
- 2 . Disconnect all connectors of the DC-AC inverter (18535-E010).
- 3 . Unscrew $PC2 \times 4$ ($n = 2$) to replace the DC-AC inverter (18535-E010).
- 4 . Reassemble the parts in the reverse order.



7.2.12 Left panel SW board (30601-BA07)

Replacement part: 30601-BA07

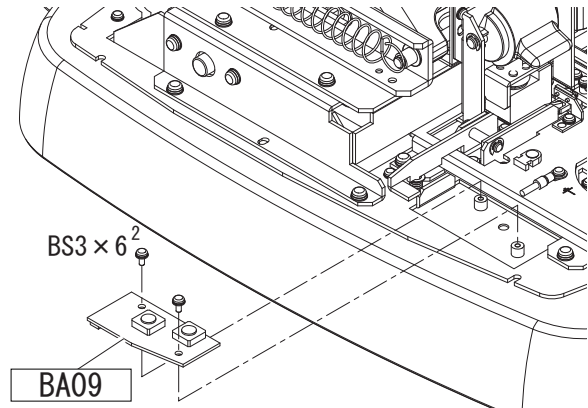
- 1 . Remove the LCD front cover (30601-M716) ([see 6.13 \[p75\]](#)).
- 2 . Unscrew $PT2 \times 5$ ($n = 2$) to replace the left panel SW board (30601-BA07).
- 3 . Reassemble the parts in the reverse order.
- 4 . Check each button in maintenance mode ([see 8.1.4 \[p122\]](#)).



7.2.13 U/D SW board (30601-BA09)

Replacement part: 30601-BA09

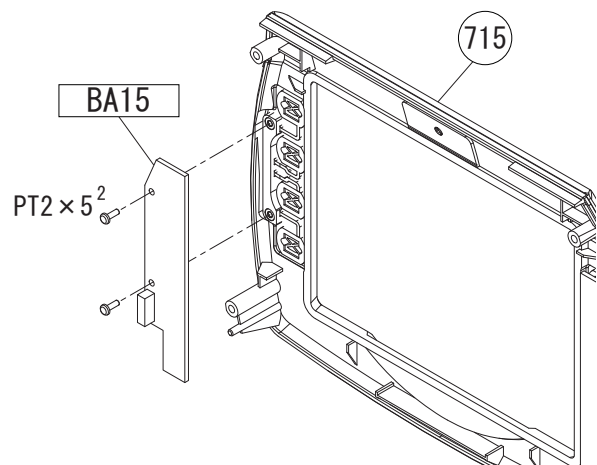
- 1 . Remove the body cover ASSY (18536-7000) ([see 6.6 \[p70\]](#)).
- 2 . Disconnect all connectors on the U/D SW board (30601-BA09).
- 3 . Unscrew BS3 × 6 (n = 2) to replace the U/D SW board (30601-BA09).
- 4 . Reassemble the parts in the reverse order.
- 5 . Check each button in maintenance mode ([see 8.1.4 \[p122\]](#)).



7.2.14 Right panel SW board (30601-BA15)

Replacement part: 30601-BA15

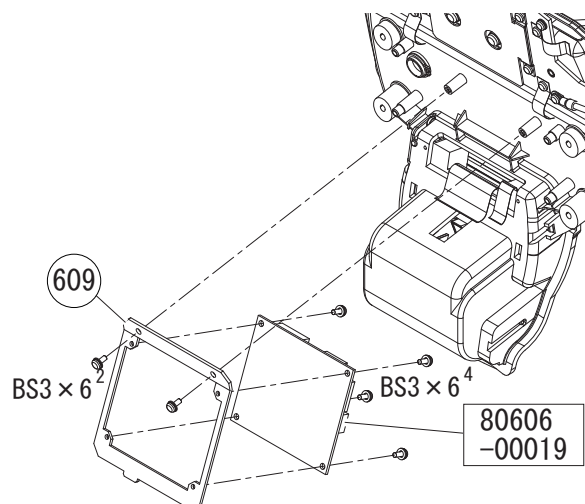
- 1 . Remove the LCD front cover (30601-M716) ([see 6.13 \[p75\]](#)).
- 2 . Unscrew PT2 × 5 (n = 2) to replace the right panel SW board (30601-BA15).
- 3 . Reassemble the parts in the reverse order.
- 4 . Check each button in maintenance mode ([see 8.1.4 \[p122\]](#)).



7.2.15 Printer interface board (80606-00019)

Replacement part: 80606-00019

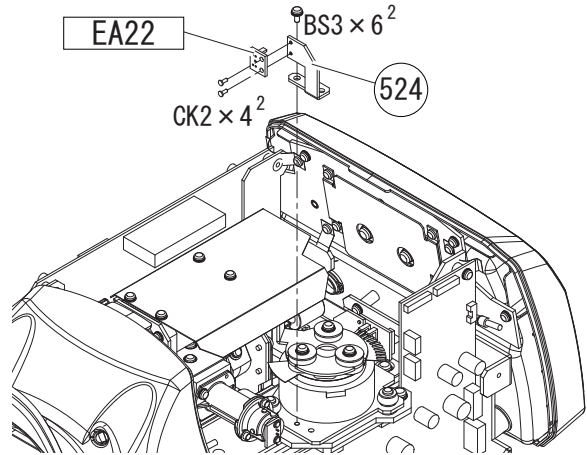
- 1 . Remove the measuring unit rear cover ASSY (18536-6000) ([see 6.3 \[p68\]](#)).
- 2 . Unscrew PT3 × 6 (n = 2) to remove the PR attachment plate (30601-M609) along with the printer interface board (80606-00019)
- 3 . Disconnect all connectors on the printer interface board (80606-00019).
- 4 . Unscrew BS3 × 6 (n = 4) to replace the printer interface board (80606-00019).
- 5 . Reassemble the parts in the reverse order.



7.3 Electrical Parts

7.3.1 SLPOS sensor (18536-EA22)

- 1 . Remove the measuring unit left cover (18536-M707) (see 6.1 [p67]).
- 2 . Remove the measuring unit right cover (18536-M708) (see 6.2 [p67]).
- 3 . Disconnect P322 (J22) on the driver board (18536-BA03).
- 4 . Unscrew BS3 × 6 to remove the SLPOS sensor (18536-EA22) along with the sensor plate (18536-M524).
- 5 . Unscrew CK2 × 4 (n = 2) to replace the SLPOS sensor (18536-BA22).
- 6 . Reassemble the parts in the reverse order.

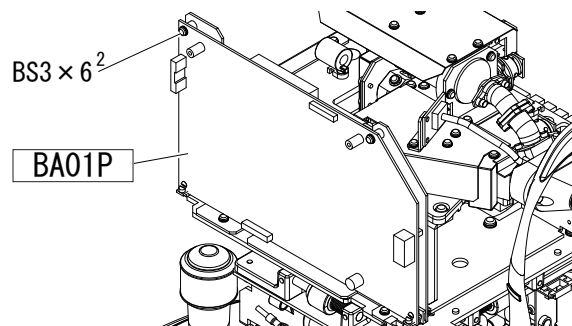


7.3.2 FIX LED

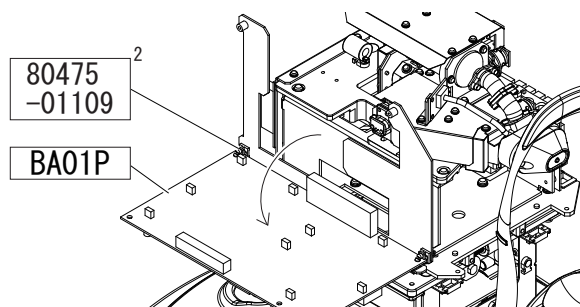
7.3.2.1 NT-510/NT-530 FIX LED (18536-EA26)

Replacement part: 18536-EA26

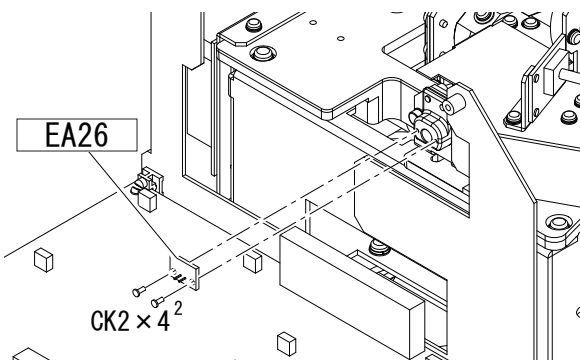
- 1 . Unscrew BS3 × 6 (n = 2) fastening the main board (18536-BA01).




- 2 . Open the main board (18536-BA01P) with holding the pierce holds (80475-01109 [n = 2]).
- 3 . Disconnect P306 (J6) on the driver board (18536-BA03).



- 4 . Unscrew CK2 × 4 (n = 2) to replace FIX LED (18536-EA26).
- 5 . Reassemble the parts in the reverse order.




 Note	Before reassembling the parts, confirm that the surface of FIX LED (18536-EA26) has no adhesive smears or scratches.
--	--

- 6 . Perform [Fixation light position](#) (see 8.3.7.1 [p143]).

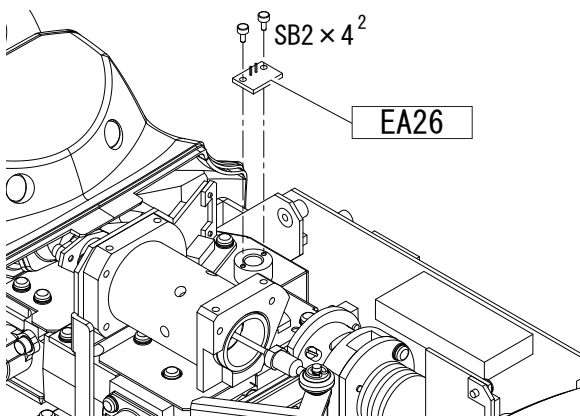
7.3.2.2 NT-530P FIX LED (18538-EA26)

Replacement part: 18538-EA26

- 1 . Remove the dust cover (15601-M554) (see 6.9 [p72]).
- 2 . Unscrew SB2 × 4 (n = 2) to replace FIX LED (18538-EA26).
- 3 . Reassemble the parts in the reverse order.

 Note	Before reassembling the parts, confirm that the surface of FIX LED (18538-EA26) has no adhesive smears or scratches.
--	--

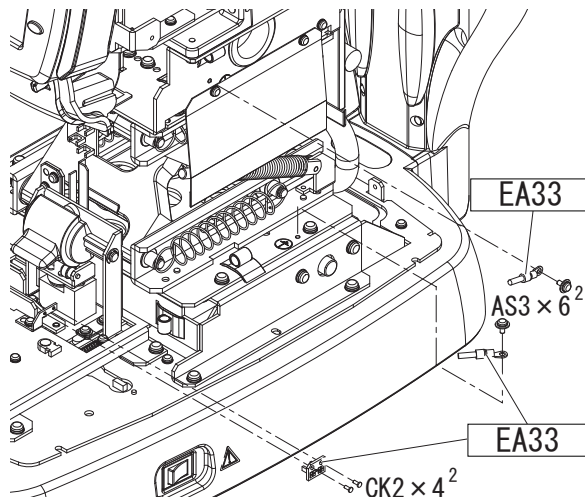
- 4 . Perform [Fixation light position](#) (see 8.3.7.2 [p145]).



7.3.3 Front/RL sensor (18536-EA33)

Replacement part: 18536-EA33

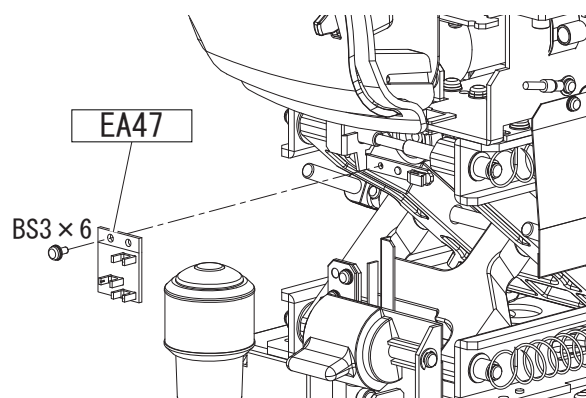
- 1 . Remove the body cover ASSY (18536-7000) ([see 6.6 \[p70\]](#)).
- 2 . Disconnect P318 (J18) and P319 (J19) on the driver board (18536-BA03).
- 3 . Disconnect P901 (J1) on the U/D SW board (30601-BA09).
- 4 . Disconnect P2501 (J1) on the front/RL sensor board (18536-BA25) ([see 7.2.9 \[p98\]](#)).
- 5 . AS3 × 6 (n = 2) to disconnect the two ground cables of the front/RL sensor (18536-EA33).
- 6 . Unscrew CK2 × 4 (n = 2) to remove the stopper board (15601-BA24) of the front/RL sensor (18536-EA33).
- 7 . Replace the front/RL sensor (18536-EA33).
- 8 . Reassemble the parts in the reverse order.



7.3.4 U/D sensor (18536-EA47)

Replacement part: 18536-EA47

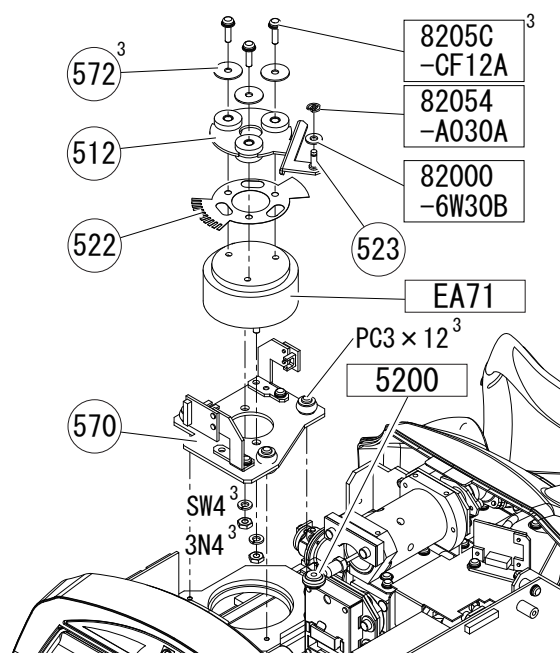
- 1 . Remove the body cover ASSY (18536-7000) ([see 6.6 \[p70\]](#)).
- 2 . Disconnect P315 (J15) on the driver board (18536-BA03).
- 3 . Unscrew BS3 × 6 (n = 2) to replace the U/D sensor (18536-EA47).
- 4 . Reassemble the parts in the reverse order.
- 5 . Perform [TRC LIMIT ADJUST](#) ([see 8.5.3 \[p191\]](#)).



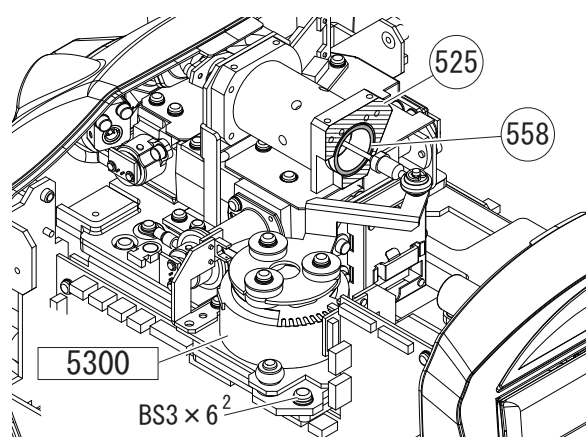
7.3.5 Solenoid (18536-EA71)

Replacement part: 18536-EA71

- 1 . Remove the dust cover (15601-M554) ([see 6.9 \[p72\]](#)).
- 2 . Remove the clip ring (82054-A030A).
- 3 . Remove the piston ASSY (18536-5200) from the spindle (18536-M523). Then, remove the nylon washer (82000-6W30B).
- 4 . Unscrew PC3 × 12 (n = 3) to remove the solenoid (18536-EA71) along with the solenoid mount (18536-M570).
- 5 . Unscrew the SEMS fasteners (82053-CF12A [n = 3]) to remove the washers (18536-M572 [n = 3]), crank (18536-M512), and shield plate (18536-M522).
- 6 . Unscrew 3N4 (n = 2) and SW4 (n = 2) to replace the solenoid (18536-EA71).
- 7 . Reassemble the parts in the reverse order.




- 8 . Loosen BS3 × 6 (n = 2) to adjust the position of the solenoid ASSY so that the end face of the piston (18536-M558) is aligned to that of the cylinder joint (15601-M525).



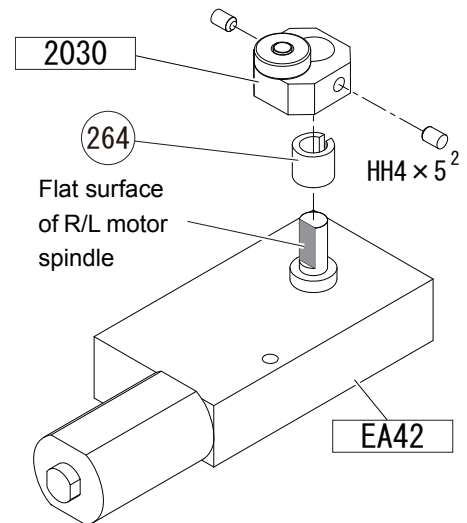
- 9 . Perform the following.
 - 1) Solenoid brake ([See 8.3.8 \[p146\]](#).)
 - 2) Puffed air pressure ([See 8.3.9 \[p147\]](#).)
 - 3) Model eye measurements ([See 8.3.13 \[p151\]](#).)
 - 4) A/B constant ([See 8.3.14 \[p154\]](#).)

7.3.6 R/L motor (18537-EA42)


Replacement part: 18537-EA42

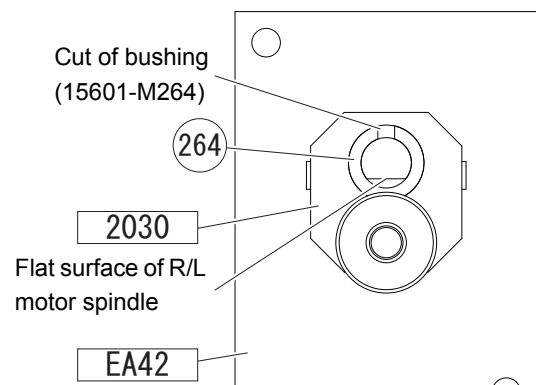
 **Caution** NT-530/NT-530P only

- 1 . Remove the R/L motor ASSY (18537-2510) (see 7.1.8 [p88]).
- 2 . Unscrew HH4 × 5 (n = 2) to remove the arm driving (15601-2030). Then, replace the R/L motor (18537-EA42).




- 3 . Reassemble the parts in the reverse order.

 **Caution** Assemble the R/L motor (18537-EA42), bushing (15601-M264), and arm driving (15601-2030) in the orientations as shown to the right.

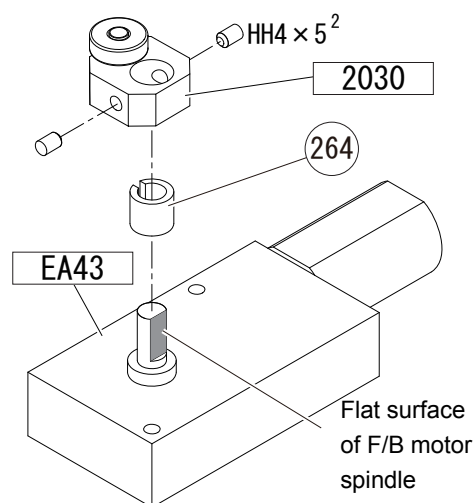


7.3.7 F/B motor (18537-EA43)


Replacement part: 18537-EA43

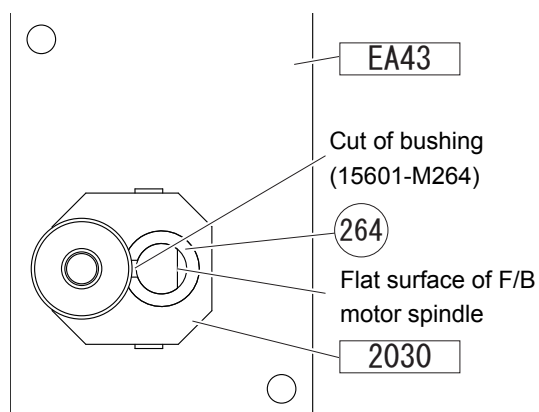
 **Caution** NT-530/NT-530P only

- 1 . Remove the F/B motor ASSY (18537-2520) (see 7.1.9 [p89]).
- 2 . HH4 × 5 (n = 2) to replace the F/B motor (18537-EA43).




- 3 . Reassemble the parts in the reverse order.

 **Caution** Assemble the F/B motor (18537-EA43), bushing (15601-M264), and arm driving (15601-2030) in the orientations as shown to the right.

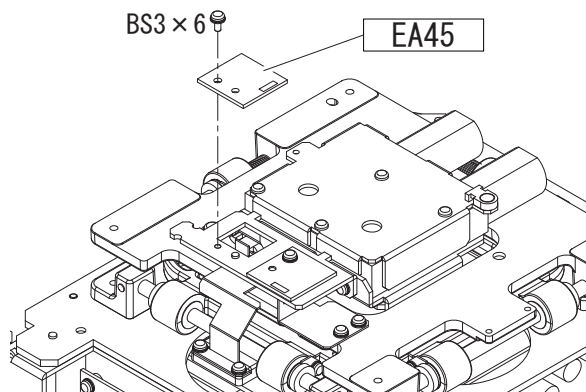


7.3.8 R/L sensor (18537-EA45)

Replacement part: 18537-EA45


 **Caution** NT-530/NT-530P only

- 1 . Remove the horizontal tracking ASSY (18537-2500) along with the adjusted NT measuring ASSY (see 7.1.8 [p88]).
- 2 . Disconnect P313 (J13) on the driver board (18536-BA03).
- 3 . Unscrew BS3 × 6 to replace the R/L sensor (18537-EA45).
- 4 . Reassemble the parts in the reverse order.
- 5 . Perform **TRC LIMIT ADJUST** (see 8.5.3 [p191]).

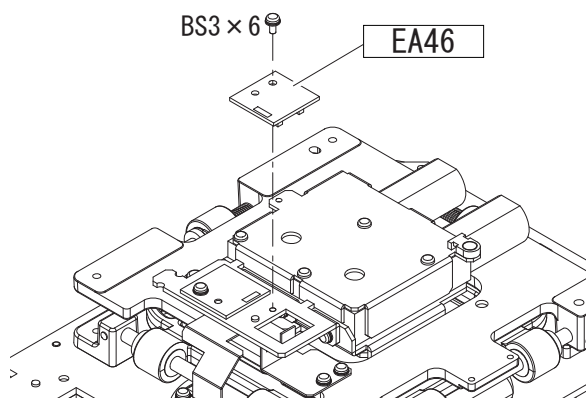


7.3.9 F/B sensor (18537-EA46)

Replacement part: 18537-EA46

 **Caution** NT-530/NT-530P only

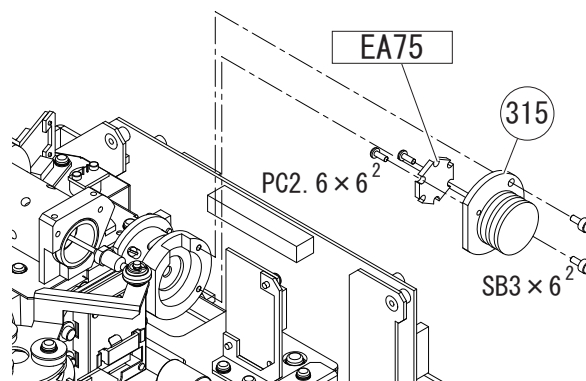
- 1 . Remove the horizontal tracking ASSY (18537-2500) along with the adjusted NT measuring ASSY (see 7.1.8 [p88]).
- 2 . Disconnect P314 (J14) on the driver board (18536-BA03).
- 3 . Unscrew BS3 × 6 to replace the F/B sensor (18537-EA46).
- 4 . Reassemble the parts in the reverse order.
- 5 . Perform **TRC LIMIT ADJUST** (see 8.5.3 [p191]).



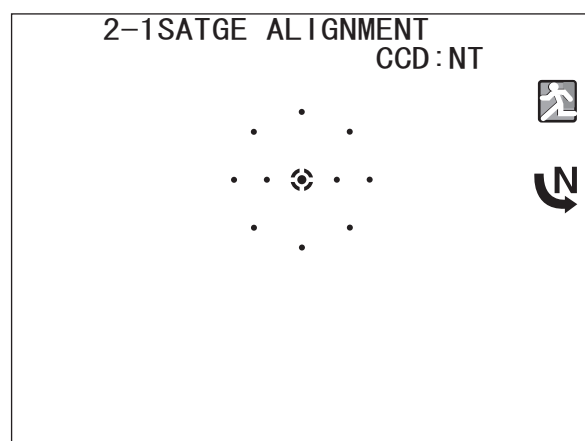
7.3.10 Pachy LED (18538-EA75)


Replacement part: 18538-EA75

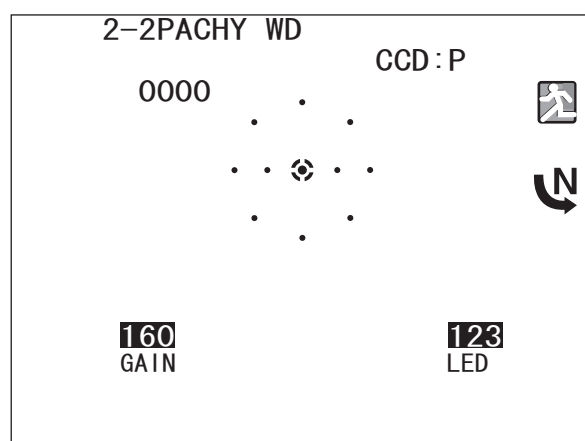
- 1 . Disconnect P2602 (J2) on the pachy board (18538-BA26).
- 2 . Unscrew SB3 × 6 (n = 2) to remove pachy LED (18538-EA75) along with the heat sink (18538-M315).
- 3 . Unscrew PC2.6 × 6 (n = 2) to replace pachy LED (18538-EA75).
- 4 . Reassemble the parts in the reverse order.




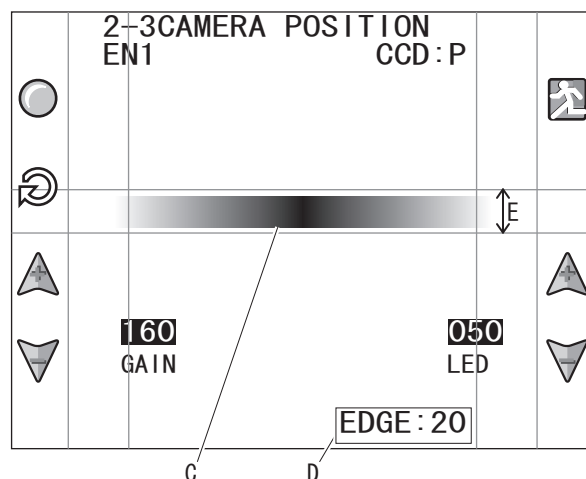
- 5 . Adjust the position of pachy LED (18538-EA75) by the following procedure.
 - 1) Remove the dust cover (18538-M554) ([see 6.9.2 \[p72\]](#)).
 - 2) Attach the pachy calibration jig (18570-2500) ([see 8.2.7.3 \[p134\]](#)).
 - 3) Cover the adjusted NT measuring ASSY (18538-9100) with a black cloth or such to shade it from interference light.
 - 4) Enter pachy adjustment mode to select "2. CAMERA POSITION" ([see 8.1.2 \[p120\]](#)).






- 5) Press the next button  to display "2-2PACHY WD".



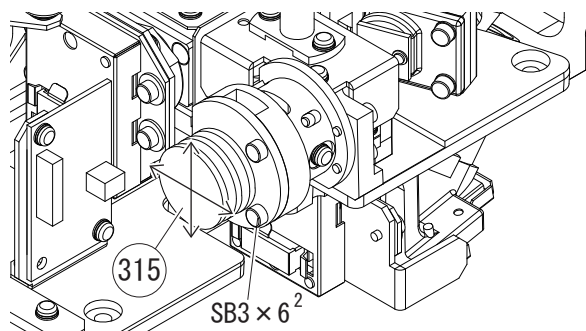
- 6) Press the next button  to display "2-3CAMERA POSITION".



- 7) If the slit (C) cannot be seen clearly, adjust the right-side screen with the up+ button  and down- button  to adjust the LED intensity by the following procedure.

 **Caution** The EDGE value (D) changes according to the adjusted LED intensity. "LED OVER" must not be displayed in the D area.

- 8) Loosen BS3 × 6 (n = 2) to adjust the position of the heat sink (18538-M315) so that the slit (C) appears brightest.



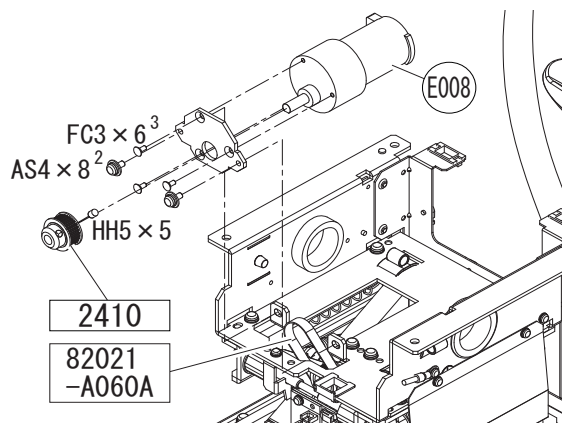
6 . Perform the following.

- 1) Pachy calibration ([See 8.4.3 \[p168\].](#))

7.3.11 Gear-equipped brushless motor (15601-E008)

Replacement part: 15601-E008

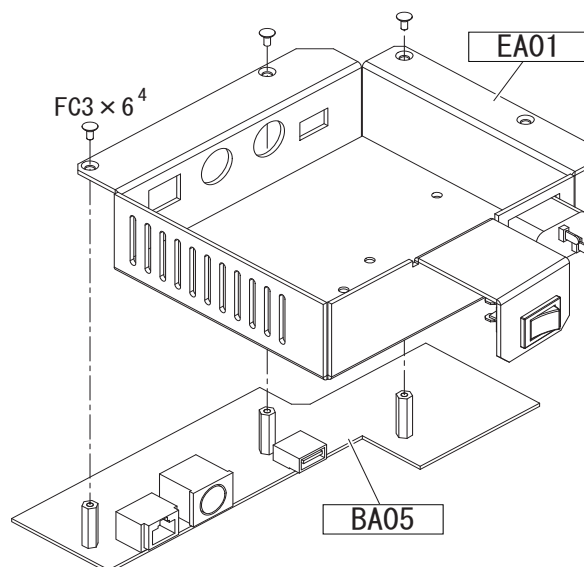
- 1 . Remove the NT measuring ASSY by the following procedure.
 - 1) NT-510: Remove the adjusted NT measuring ASSY (18536-9100) along with the measuring unit base (18536-M222) (see 7.1.3.1 [p79]).
 - 2) NT-530: Remove the adjusted NT measuring ASSY (18537-9100) along with the horizontal tracking ASSY (18537-2500) (see 7.1.8 [p88]).
 - 3) NT-530P: Remove the adjusted NT measuring ASSY (18537-9100) along with the horizontal tracking ASSY (18537-2500) (see 7.1.8 [p88]).
- 2 . Loosen AS4 × 8 (n = 2) to remove the timing belt (82021-A060A) from the timing pulley (15601-2410).
- 3 . Loosen AS4 × 8 (n = 2) to remove the gear-equipped brushless motor (15601-E008) along with the timing pulley (15601-2410).
- 4 . Unscrew HH5 × 5 to remove the timing pulley (15601-2410).
- 5 . Unscrew FC3 × 6 (n = 3) to replace the gear-equipped brushless motor (15601-E008).
- 6 . Reassemble the parts in the reverse order.
- 7 . When reassembling the timing belt (82021-A060A), adjust the position of the gear-equipped brushless motor (15601-E008) so that the belt is bent by about 1 mm when pushed by finger.
- 8 . Perform the following.
 - 1) AUTO TRC ADJUST (See 8.5.2 [p190].)



7.3.12 Primary unit (15601-EA01)

Replacement part: 15601-EA01

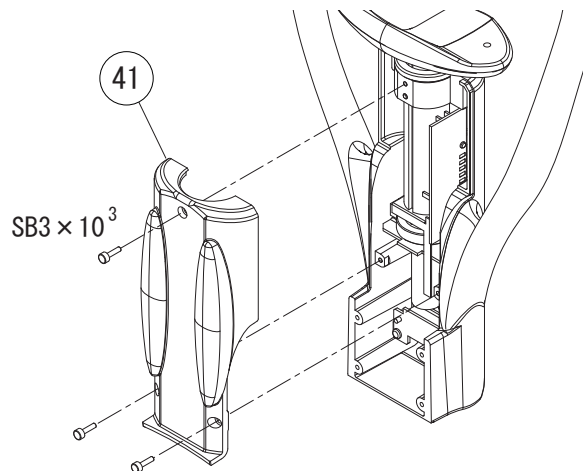
- 1 . Remove the inlet ASSY (15601-1100) (see 7.1.2 [p78]).
- 2 . FC3 × 6 (n = 4) to replace the primary unit (15601-EA01).
- 3 . Reassemble the parts in the reverse order.



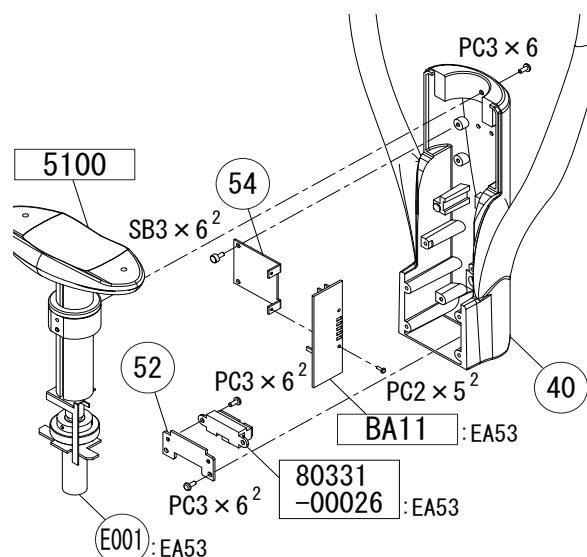
7.3.13 Chinrest (15601-EA53)

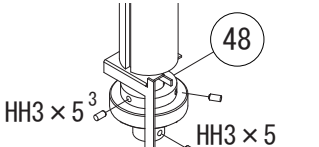
Replacement part: 15601-EA53

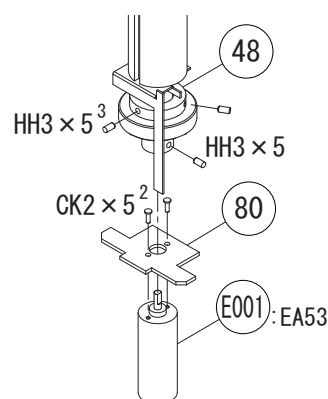
- 1 . Remove the chinrest ASSY (15601-1500) (see 7.1.10 [p90]).
- 2 . Unscrew SB3 × 10 (n = 3) to remove the chinrest lid (32105-M041).




- 3 . Unscrew SB3 × 6 to remove the chinrest ASSY (32105-5100) along with the chinrest(15601-EA53).
- 4 . Unscrew SB3 × 6 (n = 2) to remove the board bracket (30601-M054) along with the chinrest (15601-EA53).
- 5 . Unscrew PC3 × 6 (n = 2) to remove the sensor bracket (32105-M052) along with the chinrest (15601-EA53).



- 6 . Loosen HH3 × 5 (n = 3) to move the bearing shaft (32105-M048).
 - 7 . Loosen HH3 × 5 to remove the motor base (32105-M080) along with the chinrest (15601-EA53).
 - 8 . Unscrew CK2 × 5 (n = 2) to remove the geared motor (32105-E011) from the chinrest(15601-EA53).
 - 9 . Unscrew PC2 × 5 (n = 2) to remove the chinrest board (30601-BA11) from the chinrest (15601-EA53).
 - 10 . Unscrew PC3 × 6 (n = 2) to remove the start sensor (80331-00026) from the chinrest (15601-EA53).
 - 11 . Replace the chinrest (15601-EA53).
 - 12 . Reassemble the parts in the reverse order.
- 
- The diagram illustrates the disassembly of the chinrest assembly. It shows a vertical shaft with a bearing (48) at the top. A motor base (32105-M080) is secured to the shaft with three HH3 × 5 screws (labeled 3). Below the motor base is a geared motor (32105-E011) which is attached to the shaft with two CK2 × 5 screws (labeled 2). The geared motor is connected to a chinrest board (30601-BA11) which is secured with two PC2 × 5 screws (labeled 2). The chinrest board is attached to a cylindrical chinrest (15601-EA53) which is secured with two PC3 × 6 screws (labeled 2). The diagram is labeled with part numbers in circles: 48, 3, HH3 × 5, 2, CK2 × 5, 80, and E001:EA53.



 Note	Adjust the positions of the chinrest board (30601-BA11) and shield plate when assembling the board bracket (30601-M054).
--	--


13. Perform the following.
- 1) CHIN CHECK (See 8.5.4 [p192].)

7.3.14 B/W CCD camera (30601-E001)

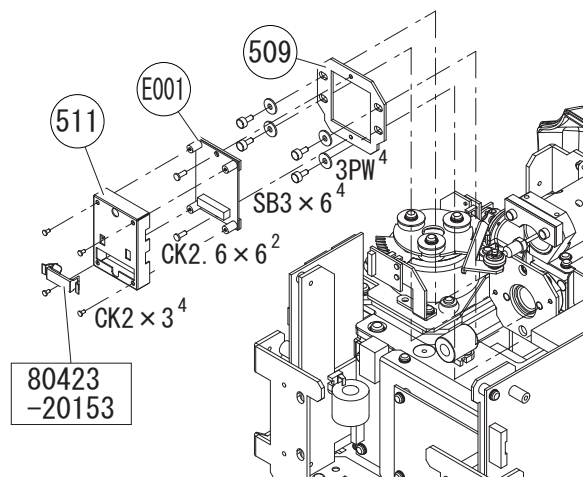
7.3.14.1 B/W CCD camera of CCD camera ASSY

Replacement part: 30601-E001

- 1 . Remove the dust cover (15601-M554) (see 6.10 [p73]).
- 2 . Remove the measuring unit rear cover ASSY (18536-6000) (see 6.3 [p68]).
- 3 . Remove the cable clamp (80423-20153).
- 4 . Unscrew CK2 × 3 (n = 4) to remove the CCD cover (15601-M511).
- 5 . Disconnect P001 (J1) of the B/W CCD camera (30601-E001).
- 6 . Unscrew CK2.6 × 6 (n = 2) to replace the B/W CCD camera (30601-E001).
- 7 . Reassemble the parts in the reverse order.

 Note	Remove dust and dirt from the B/W CCD camera (30601-E001) before assembling it.
--	---


- 8 . Perform NT camera position (see 8.3.3 [p137]).



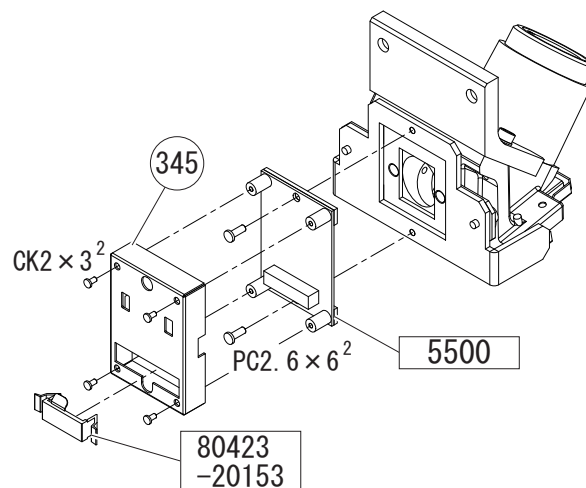
7.3.14.2 B/W CCD camera of pachy photodetector ASSY

30601-E001

- 1 . Remove the pachy photoreceptor ASSY (18538-3200) (see 7.1.13 [p91]).
- 2 . Remove the cable clamp (80423-20153).
- 3 . Unscrew CK2 × 3 (n = 4) to remove the CCD cover (30601-M345).
- 4 . Disconnect P002 (J1) of the B/W CCD camera (30601-E001).
- 5 . Unscrew CK2.6 × 6 (n = 2) to replace the B/W CCD camera (30601-E001).
- 6 . Reassemble the parts in the reverse order.

 Note	Remove dust and dirt from the B/W CCD camera (30601-E001) before assembling it.
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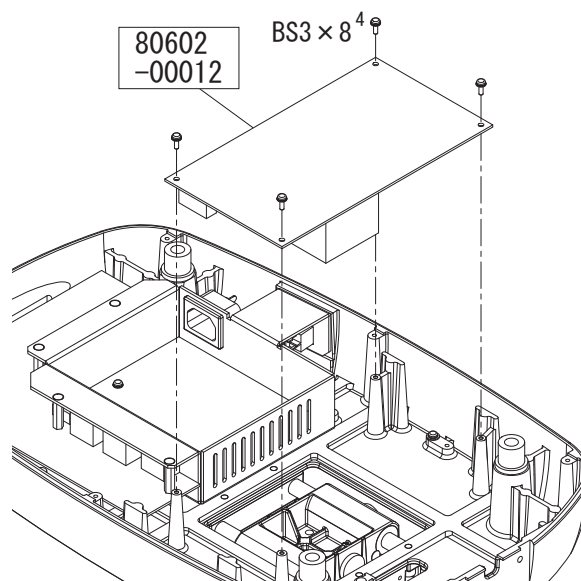
- 7 . Perform the following.
 - 1) Pachy photodetector ASSY (See 8.4.2 [p163].)
 - 2) Pachy calibration (See 8.4.3 [p168].)



7.3.15 Switching power supply (80602-00102)

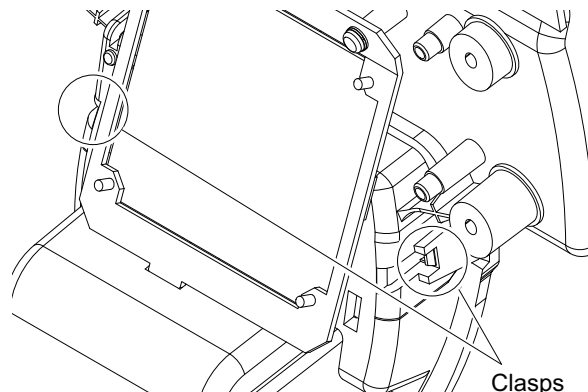
Replacement part: 80602-00102

- 1 . Remove the bottom plate (30601-M002) ([see 6.8 \[p71\]](#)).
- 2 . Disconnect J1 (P001) and J51 (P051) of the switching power supply (80602-00102).
- 3 . Unscrew BS3 × 8 (n = 4) to replace the switching power supply (80602-00102).
- 4 . Reassemble the parts in the reverse order.

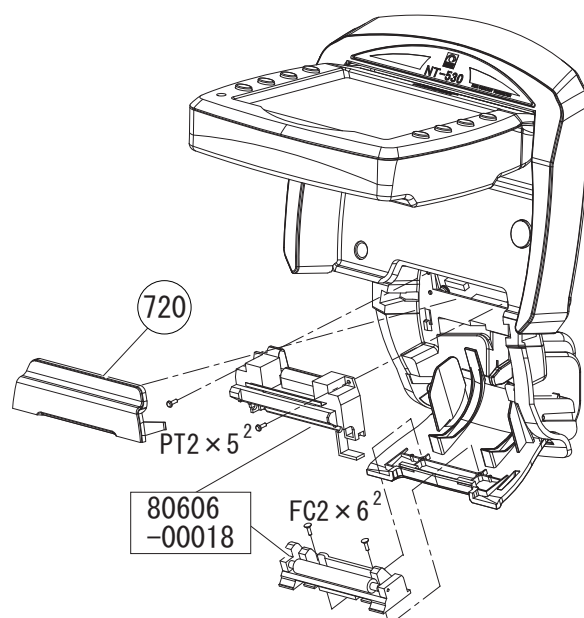


7.3.16 Printer (80606-00018)

- 1 . Remove the measuring unit rear cover ASSY (18536-6000) ([see 6.3 \[p68\]](#)).
- 2 . Unscrew PT3 × 6 (n = 2) to remove the PR attachment plate (30601-M609) along with the printer interface board (80606-00019) ([see 7.2.15 \[p101\]](#)).
- 3 . Disconnect CN3 and CN4 on the printer interface board (80606-00019).
- 4 . Open the printer door cover (18536-M710).
- 5 . Remove the printer cover (18536-M711) while pressing its clasps.



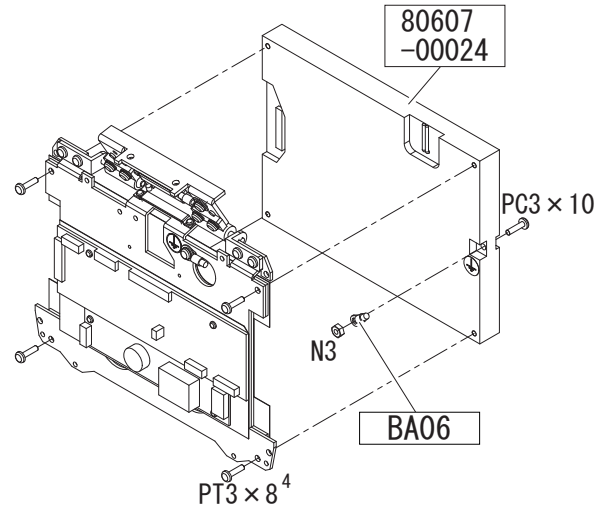
- 6 . Unscrew PT2 × 5 (n = 2) to remove the printer (80606-00018).
- 7 . Unscrew FC2 × 6 (n = 2) to remove the printer (80606-00018).
- 8 . Replace the printer (80606-00018)
- 9 . Reassemble the parts in the reverse order.



7.3.17 TFT color LCD (80607-00024)

Replacement part: 80607-00024

- 1 . Remove the LCD front cover (30601-M716) ([see 6.13 \[p75\]](#)).
- 2 . Disconnect CN2 (P002) of the DC-AC inverter (18535-E010).
- 3 . Disconnect CN1 (P001) of the TFT color LCD (80607-00024).
- 4 . Unscrew PC3 × 10 and N3 to disconnect the ground cable of the LCD board (18536-BA06).
- 5 . Unscrew PT3 × 10 (n = 4) to replace the TFT color LCD (80607-00024).
- 6 . Reassemble the parts in the reverse order.
- 7 . Perform CURSOR BOARD ([see 8.5.5 \[p192\]](#)).



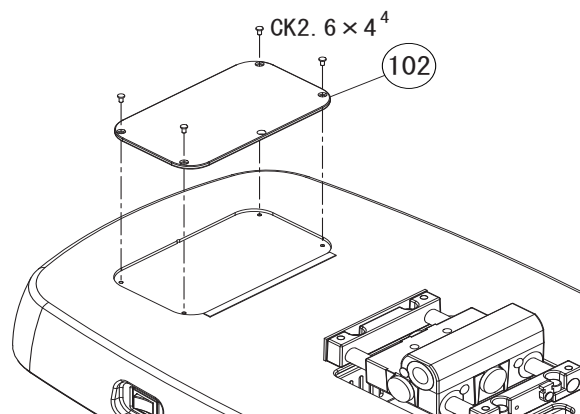
- 8 . If the model of the TFT color LCD (80607-00024) is changed from TCG057VG1AC-G00 to TCG057VG1CA-G00, change the parameter settings by the following procedure.
 - 1) Enter NT adjustment mode to select "15. SPECIAL PARAMETER" ([see 8.1.1 \[p119\]](#)).
 - 2) Set the parameter of "4. LCD MODE" from AC-G00 to CA-G00 and save it.
 - 3) Adjust the intensity of the LED for corneal illumination ([see 8.5.1 \[p189\]](#)).

7.4 Mechanical Parts

7.4.1 Sliding plate (32105-M102)

Replacement part: 32105-M102

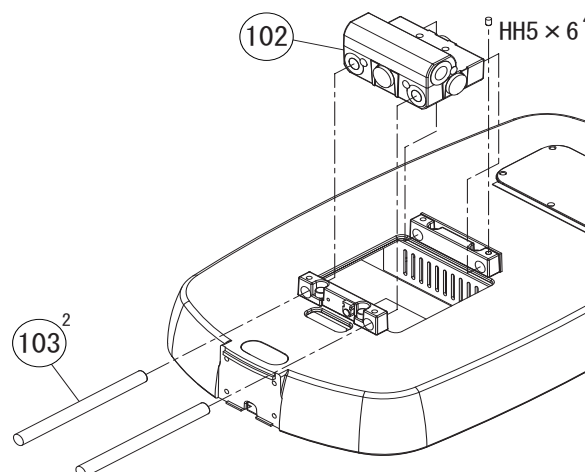
- 1 . Remove the base ASSY (18536-1000) along with the chinrest ASSY (15601-1500) ([see 7.1.1 \[p77\]](#)).
- 2 . Unscrew CK2.6 × 4 (n = 4) to replace the sliding plate (32105-M102).
- 3 . Reassemble the parts in the reverse order.




7.4.2 F/B shaft (30601-M103)

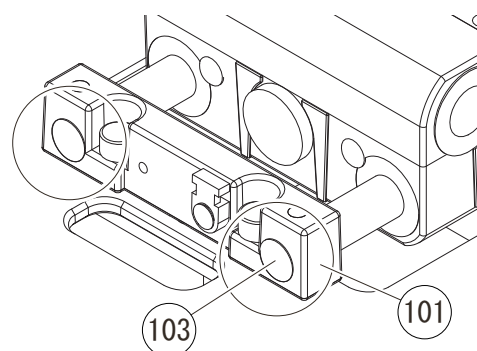
Replacement part: 30601-M103

- 1 . Remove the base ASSY (18536-1000) along with the chinrest ASSY (15601-1500) ([see 7.1.1 \[p77\]](#)).
- 2 . Replace the R/L shaft (30601-M201) ([see 7.4.3 \[p118\]](#)).
- 3 . Unscrew HH5 × 6 (n = 4) to replace the F/B shafts (30601-M103 [n = 2]).



- 4 . Reassemble the parts in the reverse order.

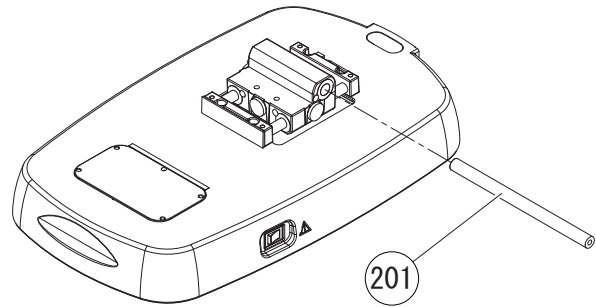
<p> Note</p>	<p>Reassemble them so that they move smoothly to the left, right, forward, and backward. Attach the F/B shafts (30601-M103 [n = 2]) to the F/B base (30601-M101) so that the tips of the F/B shafts are within 1 mm of being flush with the F/B base surface (unevenness difference: ±1 mm or less).</p>
--	--



7.4.3 R/L shaft (30601-M201)

Replacement part: 30601-M201

- 1 . Remove the base ASSY (18536-1000) along with the chinrest ASSY (15601-1500) ([see 7.1.1 \[p77\]](#)).
- 2 . Replace the R/L shaft (30601-M201)
- 3 . Reassemble the parts in the reverse order.

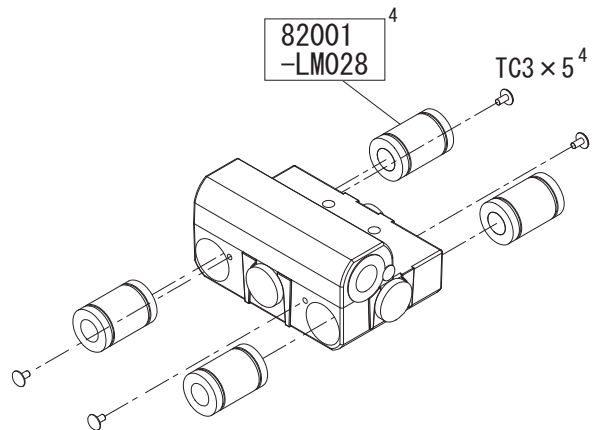


7.4.4 Linear bearing for F/B shaft (82001-LM028)

Replacement part: 82001-LM028

- 1 . Unscrew HH5 × 6 (n = 4) to replace the F/B shafts (30601-M103 [n = 2]) and F/B slider (30601-M102) ([see 7.4.2 \[p117\]](#)).
- 2 . Unscrew TC3 × 5 (n = 4) to replace the linear bearings (82001-LM028 [n = 4]).
- 3 . Reassemble the parts in the reverse order.

	Note Reassemble them so that they move smoothly.
--	--

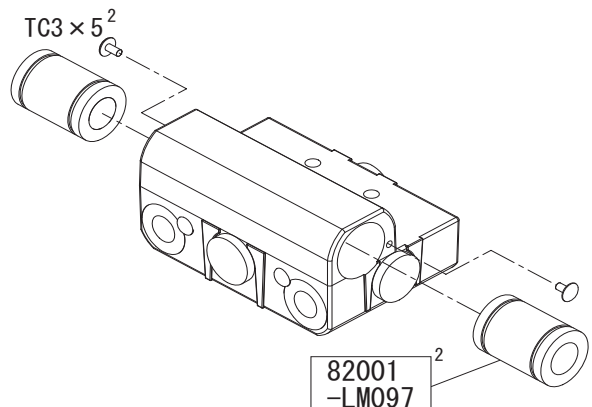


7.4.5 Linear bearing for R/L shaft (82001-LM097)

Replacement part: 82001-LM097

- 1 . Replace the R/L shaft (30601-M201) ([see 7.4.2 \[p117\]](#)).
- 2 . Unscrew TC3 × 5 (n = 2) to replace the linear bearings (82001-LM097 [n = 2]).
- 3 . Reassemble the parts in the reverse order.

	Note Reassemble them so that they move smoothly.
--	--




8 ADJUSTMENT

8.1 Entering Each Mode

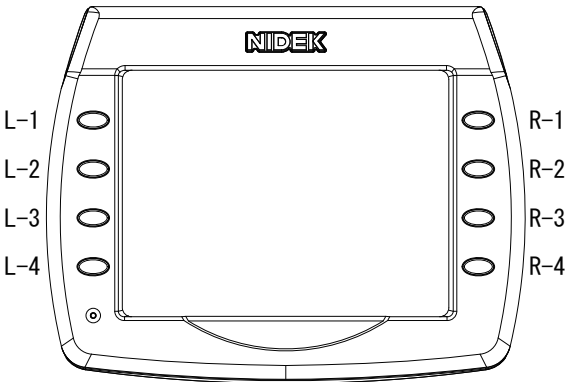
8.1.1 NT adjustment mode



- 1 . While pressing the L-1 and R-3 function buttons, turn on the power switch.

 Note


Continue pressing the function buttons until a beep sounds.





- 2 . The device starts and the password entry screen appears.
- 3 . Press the function buttons in the order of R-3, R-1, to L-2 to enter the password.
- 4 . The MENU screen is displayed.



- 5 . Press the up button  or down button  to select the desired item.





- 6 . To change pages, press the up button  or down button .





- 7 . Press the execute button  to display the selected adjustment mode screen.



MENU





- ☒ 1. AL1 2 LED FOCUS
- ☒ 2. CAMERA1
- ☒ 3. APL OPTICS AXIS
- ☒ 4. OFFSET VOTAGE
- ☒ 5. FIX OPTICS AXIS
- ☒ 6. SOLENOID
- ☒ 7. APL CENTER
- ☒ 8. CAMERA2
- ☒ 9. FOCUS CHECK
- ☒ 10. INPUT CONST
- ☒ 11. ILLUM LED VOLUME
- ☒ 12. NT TRC ADJUST
- ☒ 13. PARAMETER SETTING






MENU

- ☐ 14. EEPROM ERROR DISP
- ☐ 15. SPECIAL PARAMETER
- ☐ 16. BACKUP / RESTORE

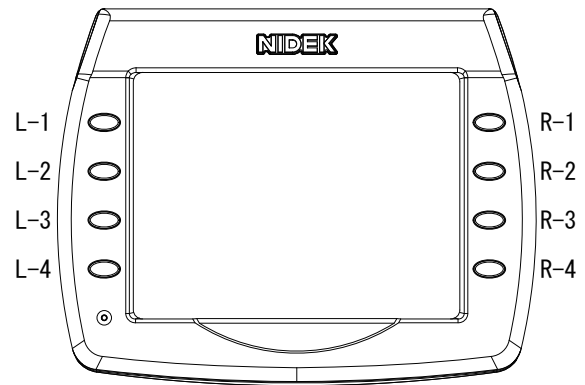





8.1.2 Pachy adjustment mode

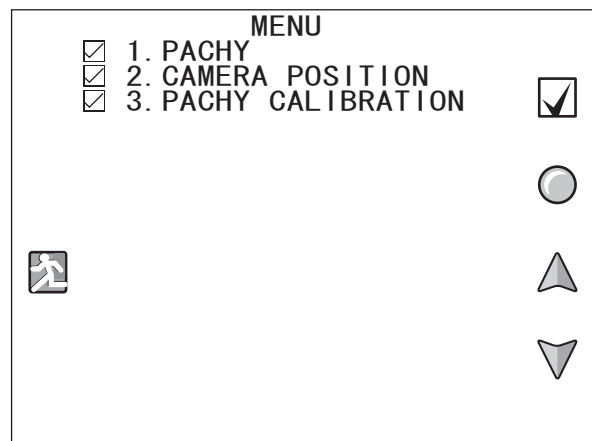
- 1 . While pressing the L-1 and R-1 function buttons, turn on the power switch.

 Note	Continue pressing the function buttons until a beep sounds.
--	---




- 2 . The device starts and the password entry screen appears.
- 3 . Press the function buttons in the order of R-3, R-1, to L-2 to enter the password.

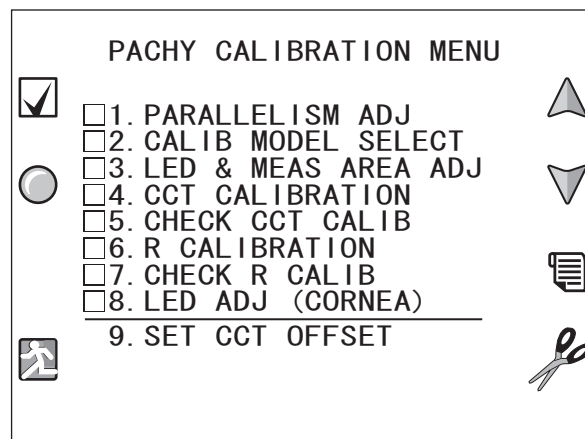


- 4 . The MENU screen is displayed.
- 5 . Press the up button  or down button  to select the desired item.
- 6 . Press the execute button  to display the selected adjustment mode screen.

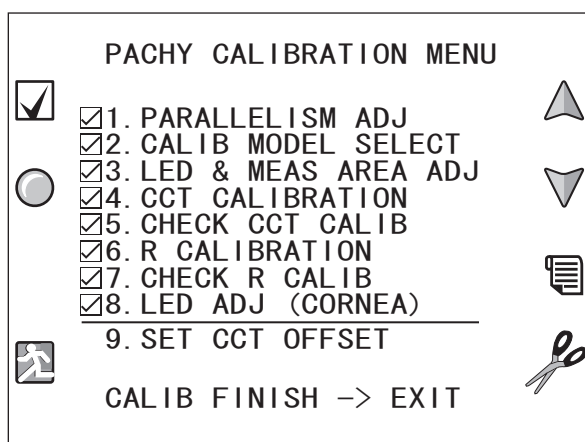


8.1.3 Pachy calibration mode

- 1 . Enter pachy adjustment mode to select "3. PACHY CALIBRATION" (see 8.1.2 [p120]).
- 2 . The PACHY CALIBRATION MENU screen is displayed.
- 3 . Press the up button  or down button  to select the desired item.
- 4 . Press the execute button  to display the selected calibration mode screen.




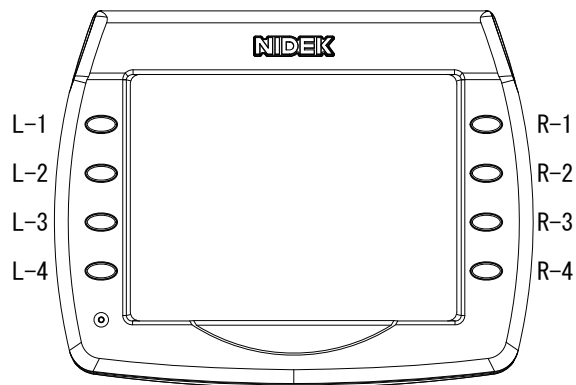
- 5 . After the pachy calibration is complete, each item checkbox is ticked and "CALIB FINISH -> EXIT" is displayed.



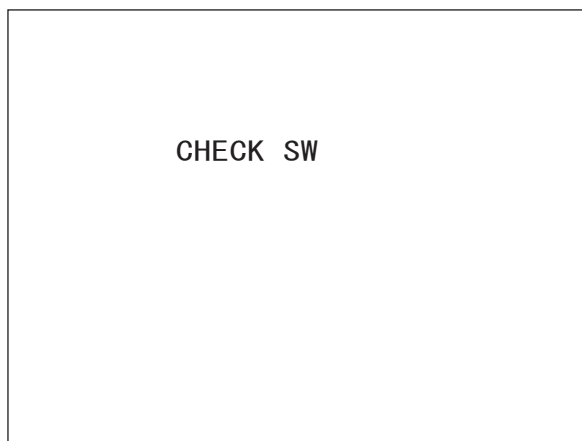
8.1.4 Maintenance mode

- 1 . While pressing the L-3 and R-3 function buttons, turn on the power switch.

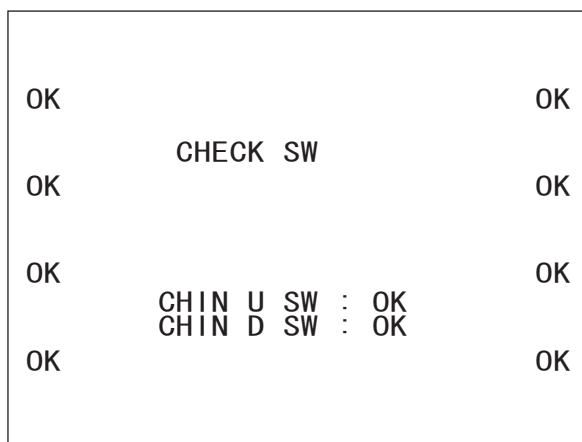
 Note	Continue pressing the function buttons until a beep sounds.
---	---






- 2 . The CHECK SW screen is displayed.
- 3 . Press the following buttons and confirm that "OK" is displayed on the screen.
 - 1) Eight function buttons
 - 2) Chinrest up/down buttons
 - 3) Start button

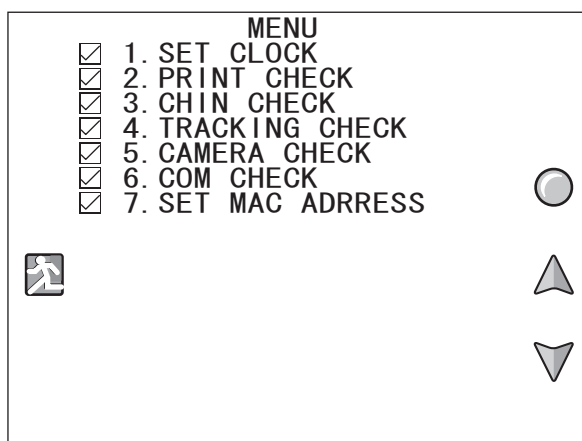


- 4 . Pressing all buttons displays "OK" and the MENU screen.



- 5 . Press the up button  or down button  to select the desired item.


- 6 . Press the execute button  to display the selected check mode screen.

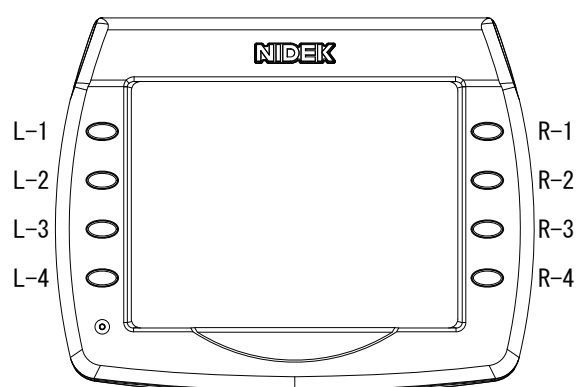




8.1.5 Inspection mode

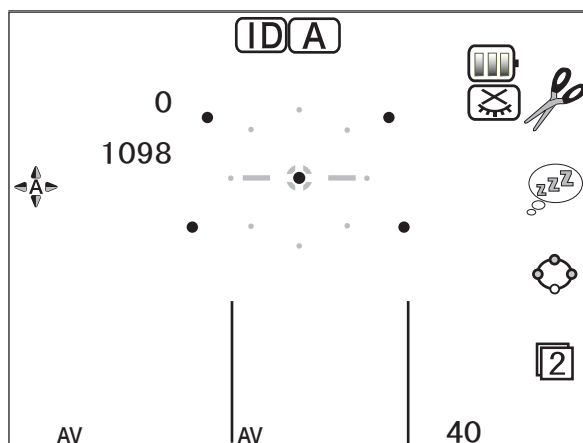
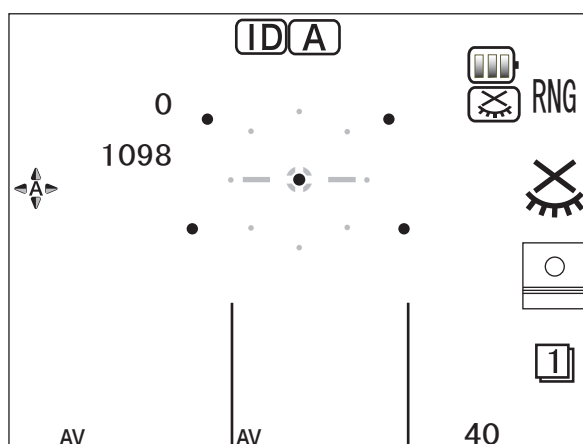
8.1.5.1 NT inspection mode

- 1 . While pressing the L-3 and R-1 function buttons, turn on the power switch.

 Note	Continue pressing the function buttons until a beep sounds.
---	---




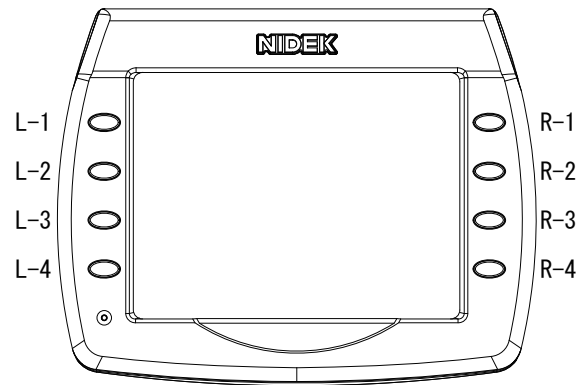
- 2 . Press the page button  →  to display Page 2.



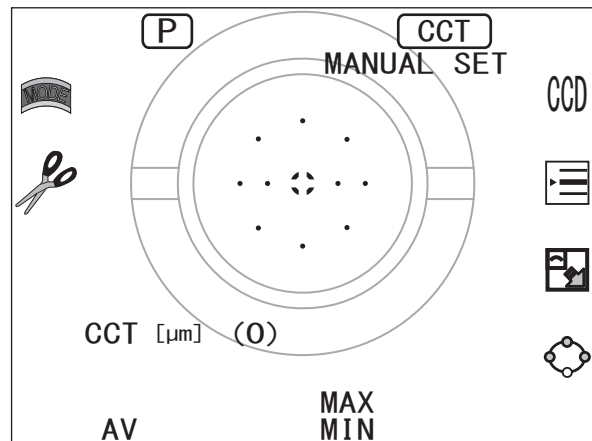
8.1.5.2 Pachy inspection mode


- 1 . While pressing the L-3 and R-2 function buttons, turn on the power switch.

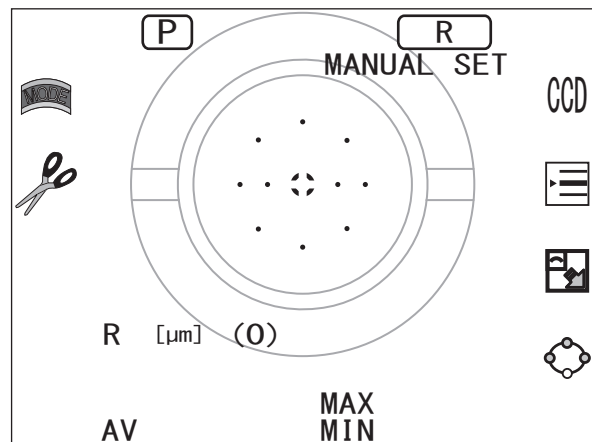
 Note	Continue pressing the function buttons until a beep sounds.
---	---





- 2 . The pachy inspection mode screen is displayed.

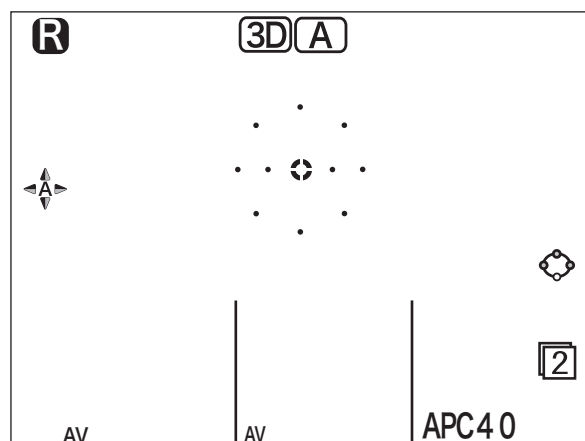






- 3 . Press the mode change button  to switch the screen to "CCT" (flat measurement) or "R" (spherical measurement).

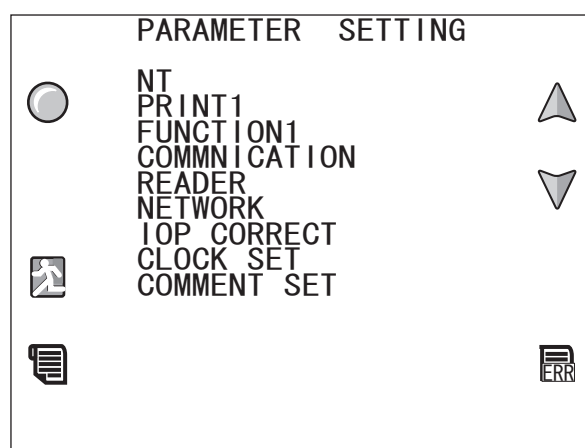


8.1.6 Parameter settings

- 1 . Press the page button  →  to display Page 2.
- 2 . Continue pressing the parameter button for 1 second or more to display the PARAMETER SETTING screen.




- 3 . Press the up button  or down button  to select the item to be changed and press the execute button .
- 4 . Press the exit button  to return to the measurement screen.

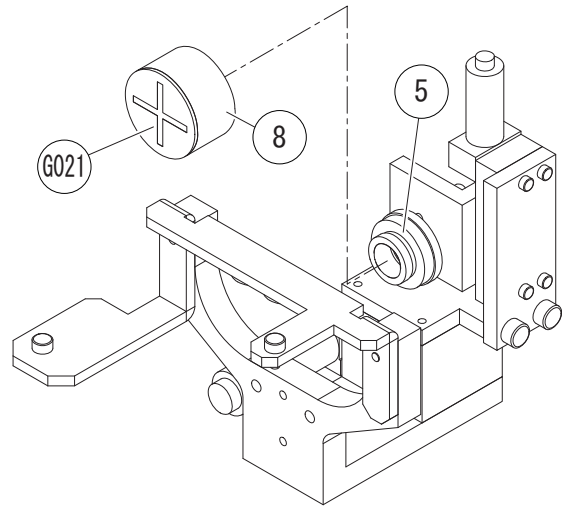


8.2 Attaching Jigs

8.2.1 IR sensor sticker (18503-G021)

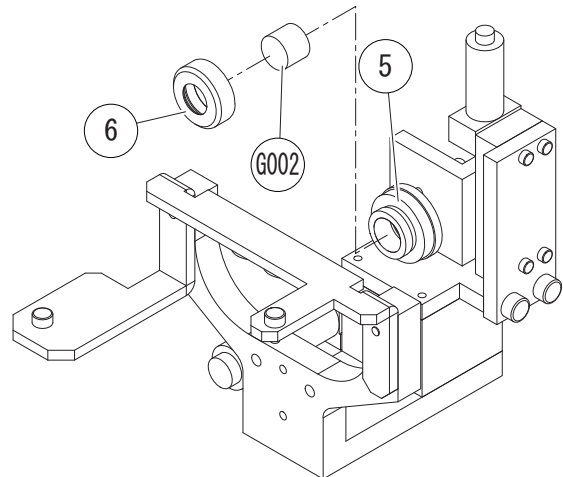
- 1 . Attach the NT-4 optical adjustment jig (18541-1019) to the adjusted NT measuring ASSY (18536-9100) ([see 8.2.3 \[p127\]](#)).
- 2 . Remove the lens lock ring (18503-M006).
- 3 . Attach the sensor bracket (1503-M008) with the IR sensor sticker (18503-G021) to the lens holder (18503-M005).

 Caution	Do not attach the sensor bracket (1503-M008) with the IR sensor sticker (18503-G021) when artificial eye B (18530-G002) is set in the lens holder.
--	--



8.2.2 Artificial eye B (18530-G002)

- 1 . Attach the NT-4 optical adjustment jig (18541-1019) to the adjusted NT measuring ASSY (18536-9100) ([see 8.2.3 \[p127\]](#)).
- 2 . Remove the lens lock ring (18503-M006).
- 3 . Attach artificial eye B (18530-G002) to the lens holder (18503-M005).
- 4 . Fasten artificial eye B (18530-G002) with the lens lock ring (18503-M006).



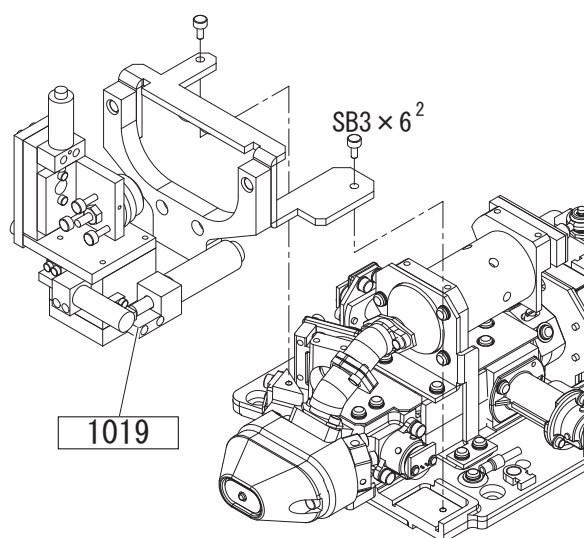
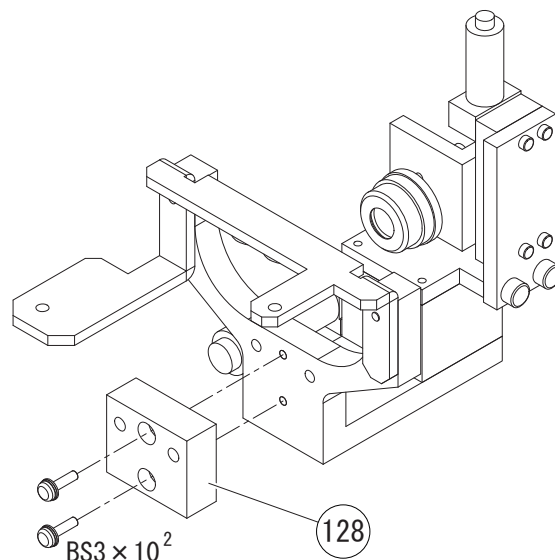
8.2.3 NT-4 optical adjustment jig (18541-1019)

- 1 . Unscrew BS3 × 10 (n = 2) to remove the NT and RKT-1 support (18541-M128) from the NT-4 optical adjustment jig (18541-1019).



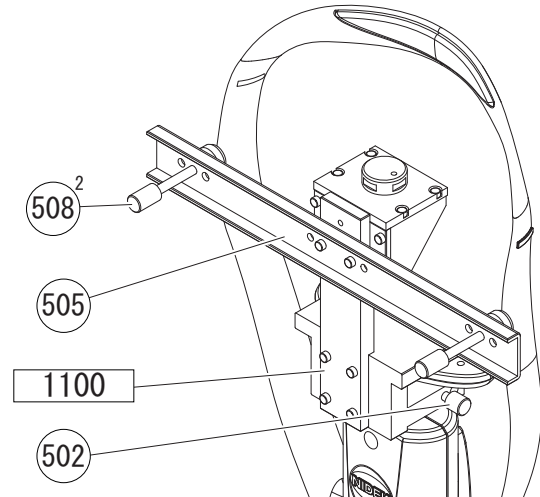
The NT and RKT-1 support (18541-M128) is necessary only when the NT-4 optical adjustment jig (18541-1019) is used for the NT-4000 and RKT-7700.

- 2 . Remove the APL PD shield (18536-M539) (see 6.11 [p74]).
- 3 . Attach the NT-4 optical adjustment jig (18541-1019) to the adjusted NT measuring ASSY (18536-9100) with SB3 × 6 (n = 2).
- 4 . After the adjustment is complete, remove the NT-4 optical adjustment jig (18541-1019).
- 5 . Reassemble the parts in the reverse order.




8.2.4 Chinrest attachment jig (32107-1100)

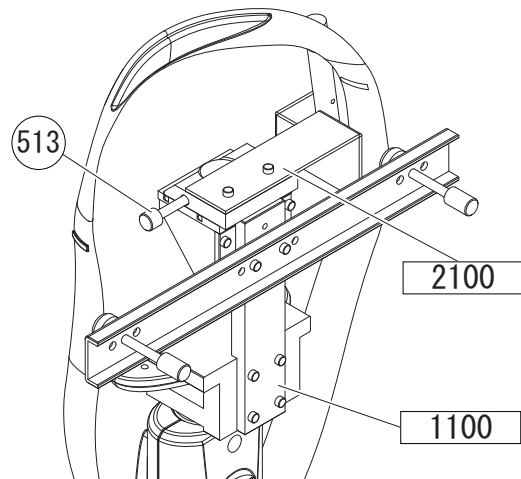
- 1 . Attach the chinrest attachment jig (32107-1100) to the chinrest ASSY (30601-5000).
- 2 . Secure the support board (32177-M505) with the fastening pins (32177-M502, 32177-M508 [n = 2]) so that it is parallel with the observation window.



8.2.5 Chinrest attachment joint (32107-2100)

- 1 . Attach the chinrest attachment jig (32107-1100) ([see 8.2.4 \[p128\]](#)).
- 2 . Attach the chinrest attachment joint (32107-2100) to the chinrest attachment jig (32107-1100)

 Note	Secure the chinrest attachment joint with the fastening pin (32177-M513).
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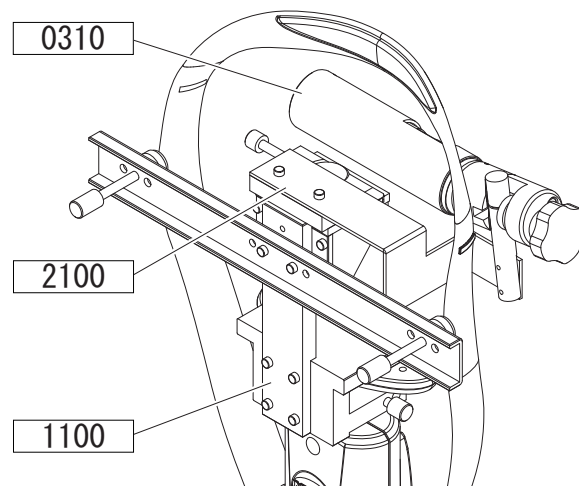


8.2.6 Model eyes

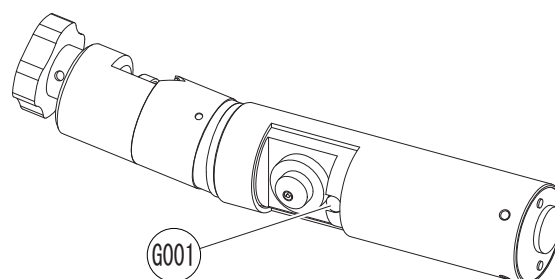
8.2.6.1 Electric model eye

8.2.6.1.1 Electric model eye (18512-0310)

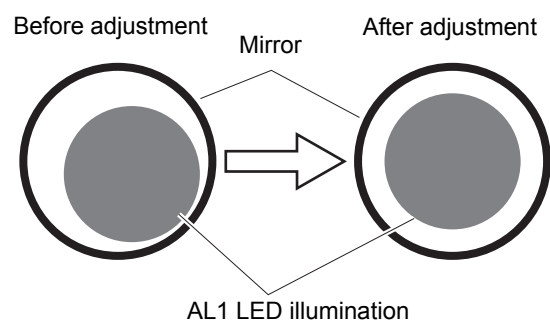
- 1 . Attach the chinrest attachment joint (32107-2100) to the chinrest attachment jig (32107-1100) (see 8.2.5 [p128]).
- 2 . Attach the detector (18512-2100) of the electric model eye (18512-0310) to the chinrest attachment joint (32107-2100).



- 3 . Move the measuring unit so that the mirror (18512-G001) of the electric model eye (18512-0310) is displayed on the screen.

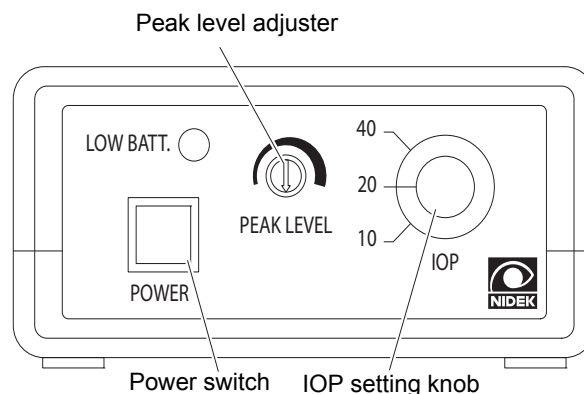


- 4 . Adjust the position of the electric model eye so that the AL1 LED illumination reflected on the mirror becomes concentric with the mirror.



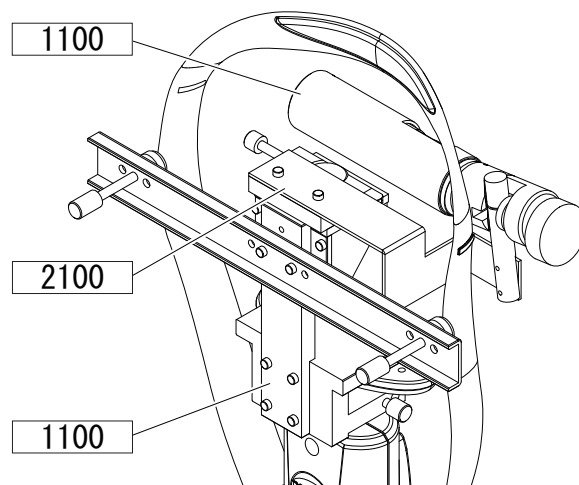
- 5 . Connect the cable of main body (18512-2200) for the electric model eye (18512-0310) to the detector (18512-2100).
- 6 . Turn on the power switch.

Note If the LED of "LOW BATT." lights up, replace the battery.

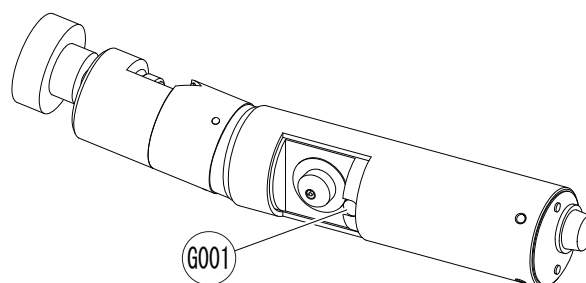


8.2.6.1.2 Electric model eye (18570-1100)

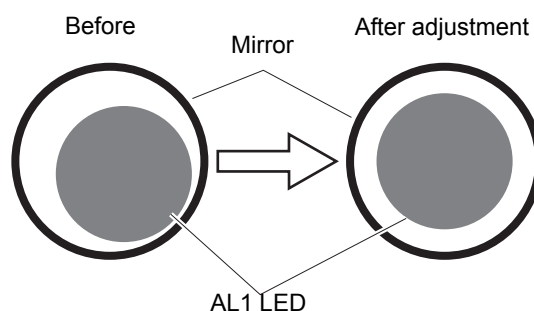
- 1 . Attach the chinrest attachment joint (32107-2100) to the chinrest attachment jig (32107-1100) (see 8.2.5 [p128]).
- 2 . Attach the detector (18570-1110) of the electric model eye(18570-1100) to the chinrest attachment joint (32107-2100).



- 3 . Move the measuring unit so that the mirror (18512-G001) of the electric model eye (18570-1100) is displayed on the screen.



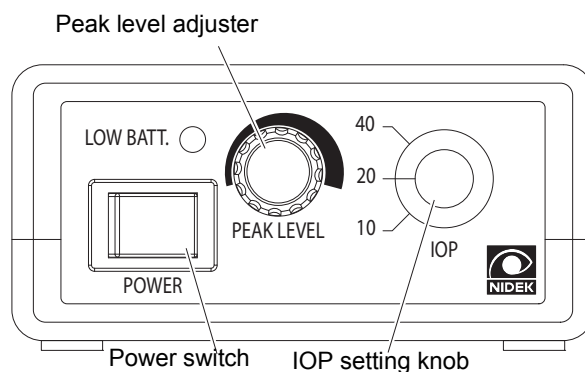
- 4 . Adjust the position of the electric model eye so that the AL1 LED illumination reflected on the mirror becomes concentric with the mirror.



- 5 . Connect the cable of main body (18570-2200) for the electric model eye 18570-1100) to the detector (18512-2100).

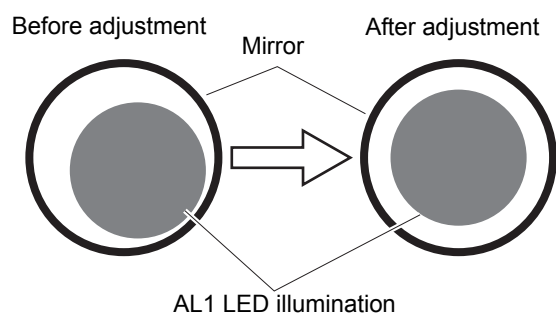
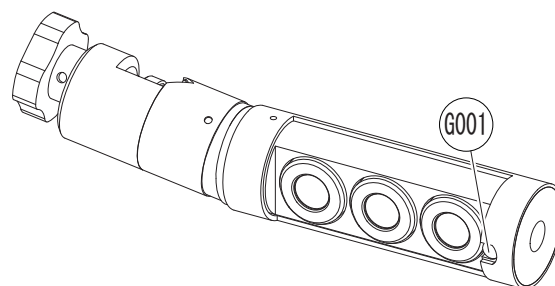
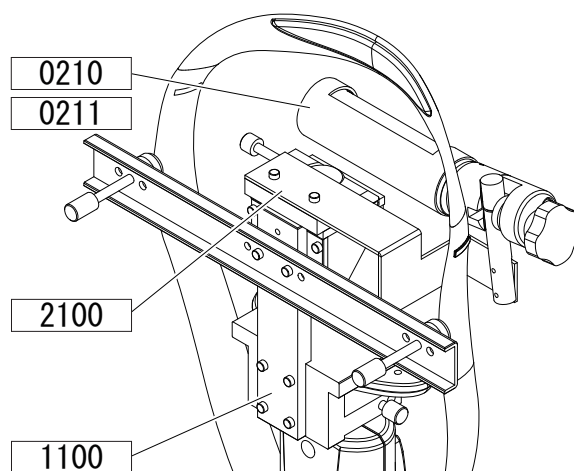
- 6 . Turn on the power switch.

	<p>Note If the LED of "LOW BATT." lights up, replace the battery.</p>
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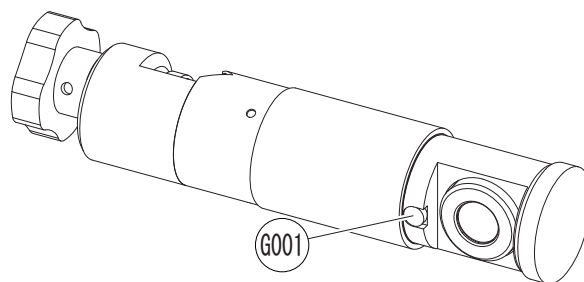
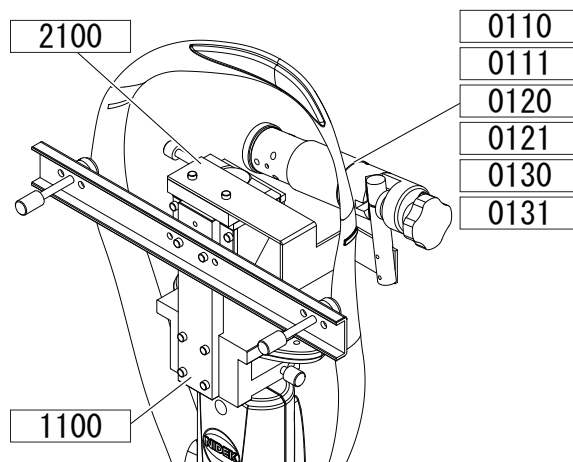
8.2.6.2 Triple calibration model eye (18512-0210)

- 1 . Attach the chinrest attachment joint (32107-2100) to the chinrest attachment jig (32107-1100) (see 8.2.5 [p128]).
- 2 . Attach the following triple calibration model eye to the chinrest attachment joint (32107-2100).
 - 1) Triple calibration model eye (18512-0210)
 - 2) Triple calibration model eye (with calibration certificate) (18512-0211)
- 3 . Move the measuring unit so that the mirror (18512-G001) of the triple calibration model eye is displayed on the screen.
- 4 . Adjust the position of the triple calibration model eye so that the AL1 LED illumination reflected on the mirror becomes concentric with the mirror.

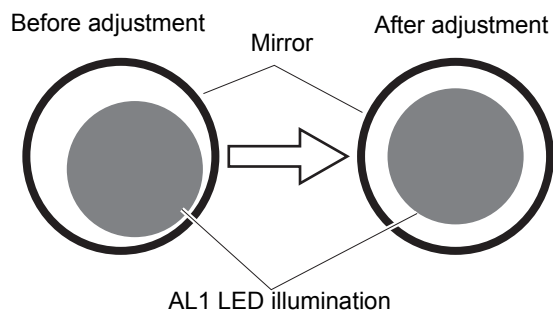


8.2.6.3 Single calibration model eye

- 1 . Attach the chinrest attachment joint (32107-2100) to the chinrest attachment jig (32107-1100) (see 8.2.5 [p128]).
- 2 . Attach the following single calibration model eye to the chinrest attachment joint (32107-2100).
 - 1) Single calibration model eye (medium pressure [18512-0110])
 - 2) Single calibration model eye (medium pressure, with calibration certificate [18512-0111])
 - 3) Single calibration model eye (low pressure [18512-0120])
 - 4) Single calibration model eye (low pressure, with calibration certificate [18512-0121])
 - 5) Single calibration model eye (high pressure [18512-0130])
 - 6) Single calibration model eye (high pressure, with calibration certificate [18512-0131])
- 3 . Move the measuring unit so that the mirror (18512-G001) of the single calibration model eye is displayed on the screen.



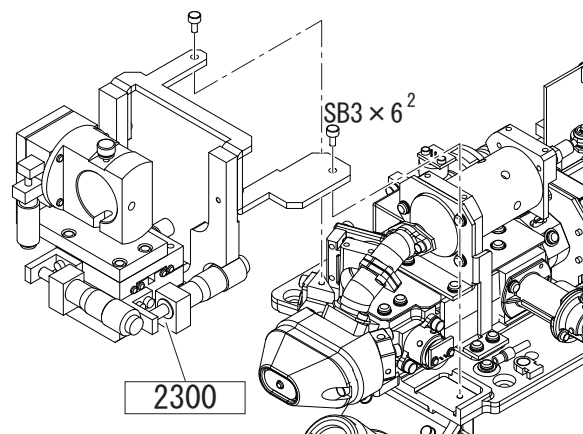
- 4 . Adjust the position of the single calibration model eye so that the AL1 LED illumination reflected on the mirror becomes concentric with the mirror.



8.2.7 Pachy adjustment jig


8.2.7.1 NT-5P optical adjustment jig (18570-2300)

- 1 . Remove the APLPD shield (18536-M539) (see 6.11 [p74]).
- 2 . Attach the NT-5P optical adjustment jig (18570-2300) to the adjusted NT measuring ASSY (18538-9100) with SB3 × 6 (n = 2).
- 3 . After the adjustment is complete, remove the NT-5P optical adjustment jig (18570-2300).
- 4 . Reassemble the parts in the reverse order.

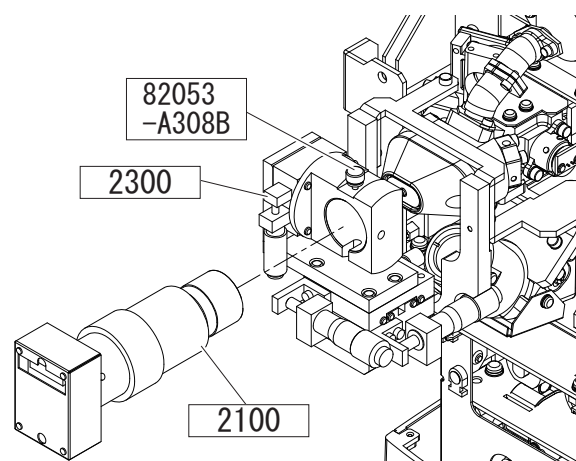


8.2.7.2 Pachy phototransmitter adjustment jig (18570-2100)

- 1 . Attach the NT-5P optical adjustment jig (18570-2300) (see 8.2.7.1 [p133]).
- 2 . Disconnect P107 (J7) on the main board (18538-BA01P).
- 3 . Attach pachy phototransmitter adjustment jig (18570-2100) to the NT-5P optical adjustment jig (18570-2300) and fasten it with the stepped knurled screw (82053-A308B).

<p> Note</p>	<p>Align the key (31401-M351) of the pachy phototransmitter adjustment jig (18570-2100) to the notch of the NT-5P optical adjustment jig (18570-2300).</p>
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- 4 . Connect the cable of the pachy phototransmitter adjustment jig (18570-2100) to P107 (J7) on the main board (18538-BA01P).



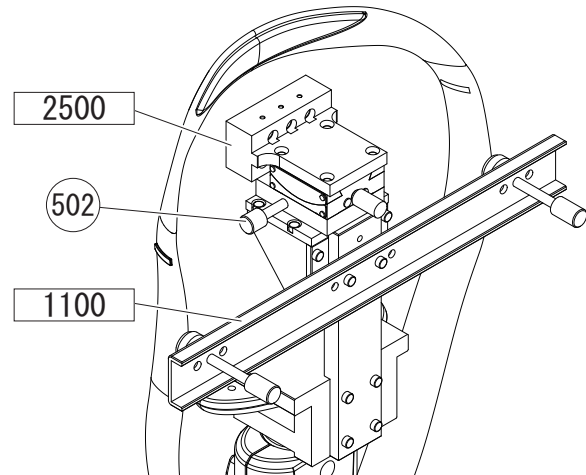
8.2.7.3 Pachy calibration jig (18570-2500)

Caution When not in use, keep the pachy calibration jig in a storage case (18541-1050).

- 1 . Attach the chinrest attachment jig (32107-1100) (see 8.2.4 [p128]).
- 2 . Attach the pachy calibration jig (18570-2500) to the chinrest attachment jig (32107-1100).



Secure the jig with the fastening pin (32177-M502).

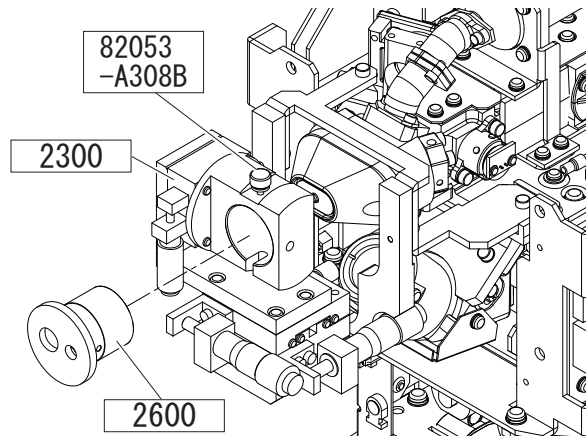


8.2.7.4 Pachy adjustment model eye holder (18570-2600)

- 1 . Attach the NT-5P optical adjustment jig (18570-2300) (see 8.2.7.1 [p133]).
- 2 . Attach the pachy adjustment model eye holder (18570-2600) to the NT-5P optical adjustment jig (18570-2300) and fasten it with the stepped knurled screw (82053-A308B).

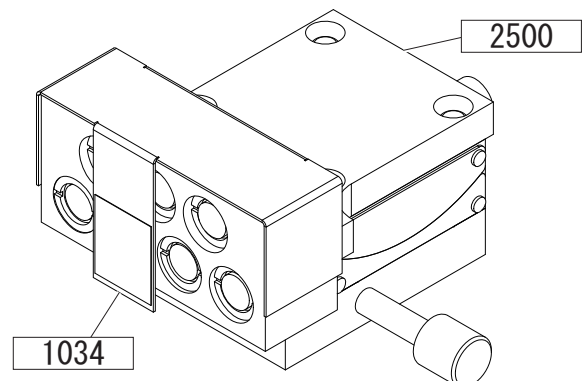


Align the key (31401-M351) of the pachy adjustment model eye holder (18570-2600) to the notch of the NT-5P optical adjustment jig (18570-2300).



8.2.7.5 Filter jig (18541-1034)

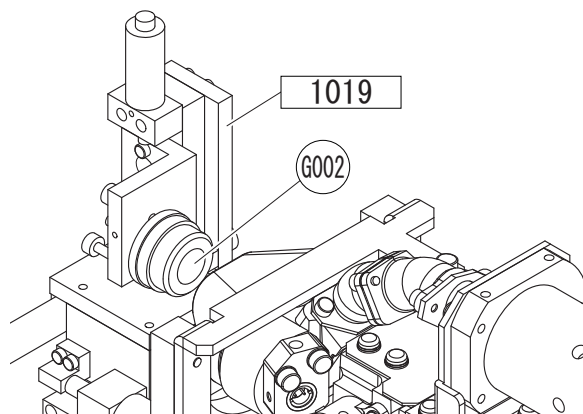
- 1 . Attach the pachy calibration jig (18570-2500) (see 8.2.7.3 [p134]).
- 2 . Attach the filter jig (18541-1034) to the pachy calibration jig (18570-2500).



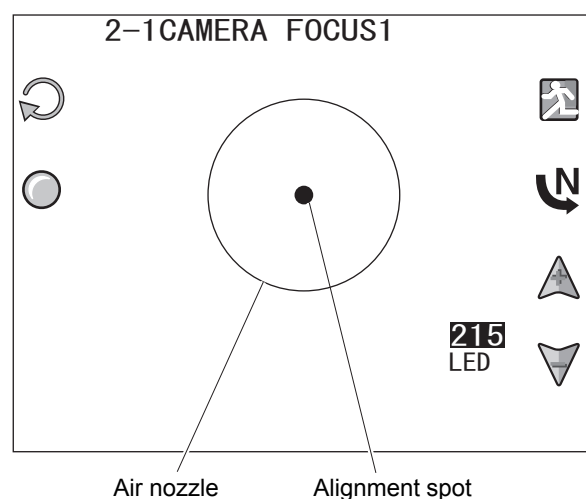
8.3 Tonometer Adjustment


8.3.1 Camera focus

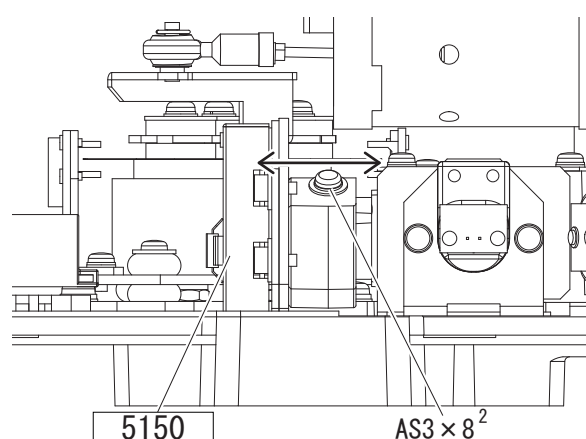
- 1 . Attach the following jigs.
 - 1) NT-4 optical adjustment jig (18541-1019) (See 8.2.3 [p127].)
 - 2) Artificial eye B (18530-G002) (See 8.2.2 [p126].)
- 2 . Set the distance between the tip of the air nozzle and artificial eye B (18530-G002) to 11 mm with the block (18504-M018) of the distance alignment rod (18504-1600).
- 3 . Enter adjustment mode to select "2. CAMERA1" (see 8.1.1 [p119]).



- 4 . Using the NT-4 optical adjustment jig (18541-1019), adjust so that the alignment spot becomes concentric with the air nozzle.




- 5 . Loosen AS3 × 8 (n = 2) and adjust the position of the CCD camera ASSY (18536-5150) so that the alignment spot appears on the screen as smallest as possible and most sharply defined.
- 6 . After the adjustment is complete, press the exit button  and turn off the power switch.
- 7 . Remove the jigs.
- 8 . Reassemble the removed covers and units in the reverse order.

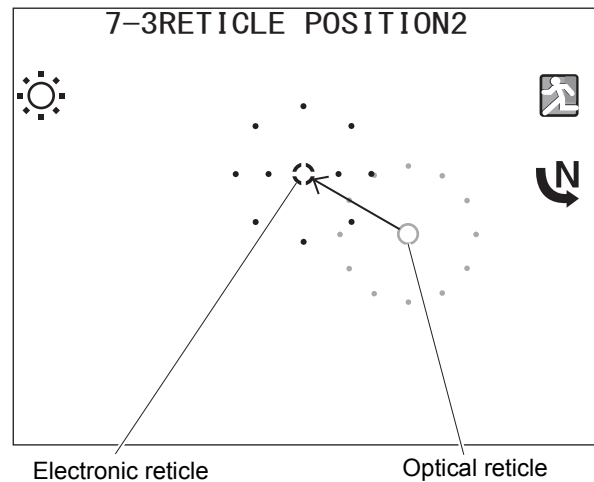


8.3.2 Optical reticle position

1 . Enter adjustment mode to select "7. APL CENTER" (see 8.1.1 [p119]).

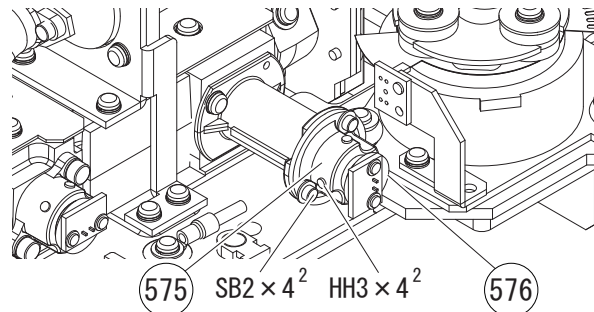
2 . Press the next button  twice to display 7-3RETICLE POSITION2.


3 . Press the reticle button  to light up the electronic reticle.



4 . Loosen HH3 \times 4 ($n = 2$) to adjust the position of reticle holder 3 (15601-M576) so that the optical reticle appears most sharply defined.

5 . Loosen SB2 \times 4 ($n = 2$) to adjust the position of reticle holder 2 (15601-M575) so that the center circle of the optical reticle is aligned to the center of the electronic reticle.

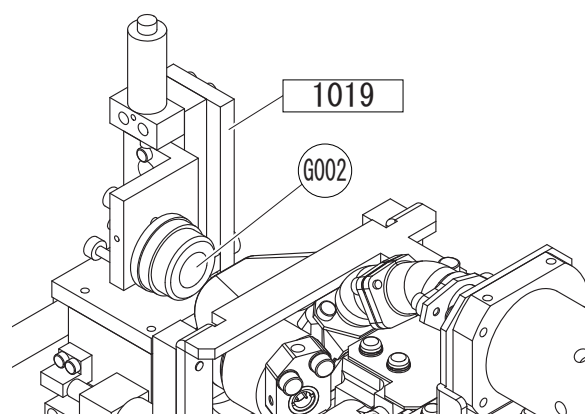


6 . After the adjustment is complete, press the exit button  and turn off the power switch.

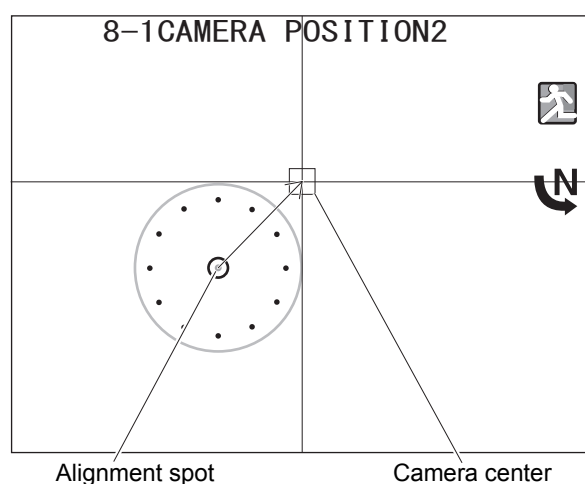
7 . Reassemble the removed covers and units in the reverse order.

8.3.3 NT camera position

- 1 . Attach the following jigs.
 - 1) NT-4 optical adjustment jig (18541-1019) (See 8.2.3 [p127].)
 - 2) Artificial eye B (18530-G002) (See 8.2.2 [p126].)
- 2 . Set the distance between the tip of the air nozzle and artificial eye B (18530-G002) to 11 mm with the block (18504-M018) of the distance alignment rod (18504-1600).



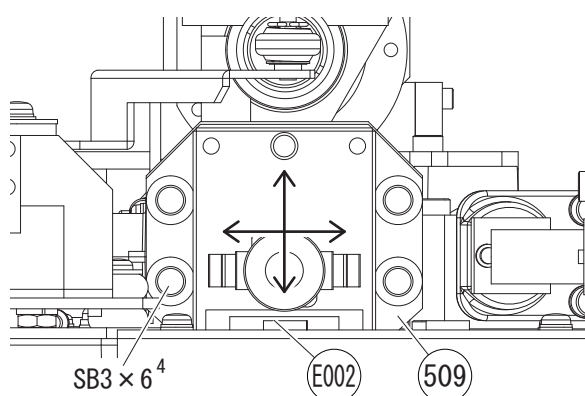
- 3 . Enter adjustment mode to select "8. CAMERA2" (see 8.1.1 [p119]).



- 4 . Loosen SB3 × 6 (n = 4) to adjust the position of the B/W CCD camera (30601-E001) along with the CCD adjustment plate (15601-M509) so that the square in the camera center is aligned to the alignment spot on the screen.

Note	To shift the screen up, move the camera upward.
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- 5 . After the adjustment is complete, press the exit button and turn off the power switch.

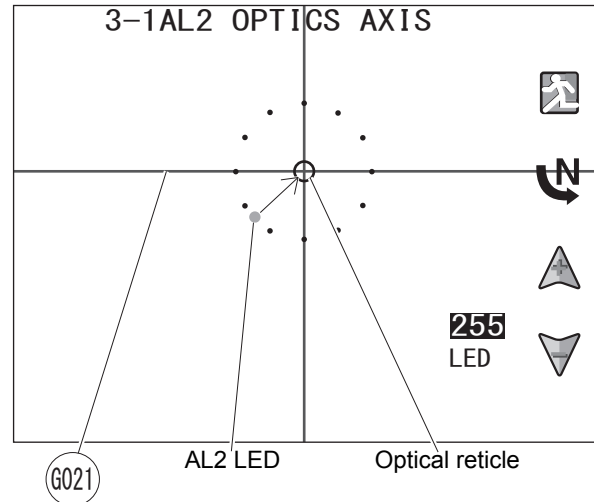



- 6 . Remove the jigs.
- 7 . Reassemble the removed covers and units in the reverse order.

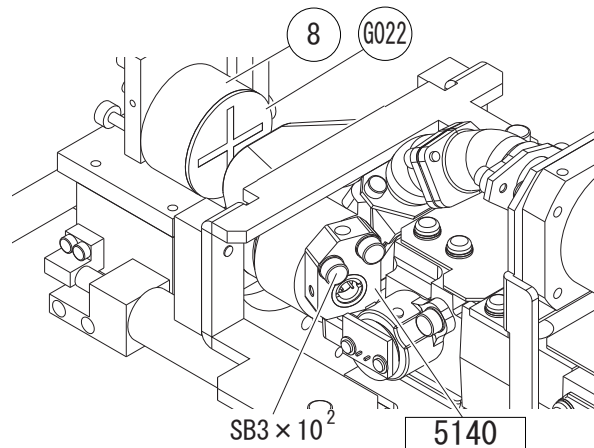
8.3.4 AL2 LED optical axis

Caution Before adjustment, darken the room.

- 1 . Attach the following jigs.
 - 1) NT-4 optical adjustment jig (18541-1019) (See 8.2.3 [p127].)
 - 2) IR sensor sticker (18503-G021) (See 8.2.1 [p126].)
- 2 . Set the distance between the tip of the air nozzle and the IR sensor sticker (18503-G021) to 11 mm with the block (18504-M018) of the distance alignment rod (18504-1600).
- 3 . Enter adjustment mode to select "3. APL OPTICS AXIS" (see 8.1.1 [p119]).
- 4 . Using the NT-4 optical adjustment jig (18541-1019), align the center circle of the optical reticle to the grid center of the IR sensor sticker (18503-G021).





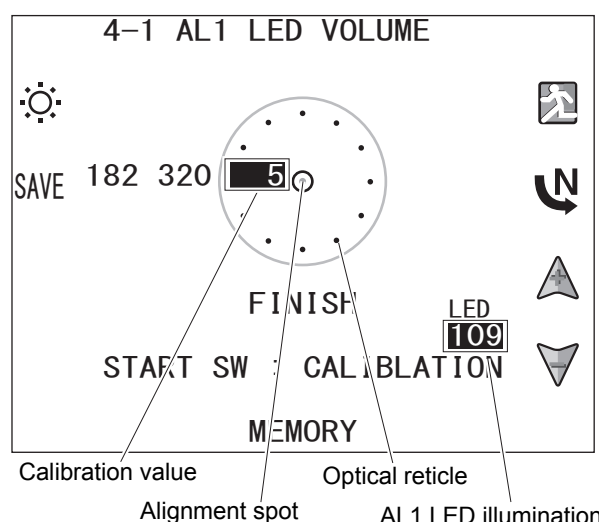
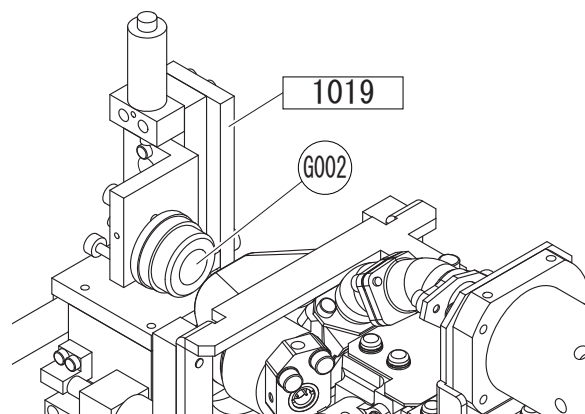
- 5 . Loosen SB3 × 10 (n = 2) fastening the AL2 LED holder ASSY (15601-5140) to adjust the position of the ASSY. Then, align the red illumination of AL2 LED to the grid center.
- 6 . After the adjustment is complete, press the exit button  and turn off the power switch.
- 7 . Remove the jigs.
- 8 . Reassemble the removed covers and units in the reverse order.




8.3.5 Alignment spot intensity


8.3.5.1 When using NT-4 optical adjustment jig (18541-1019)

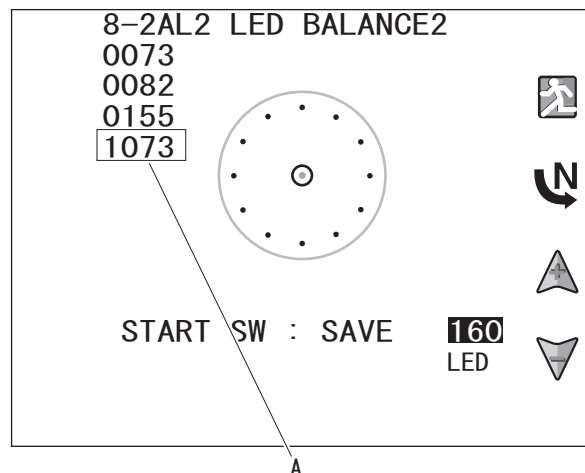
- 1 . Attach the following jigs.
 - 1) NT-4 optical adjustment jig (18541-1019) (See 8.2.3 [p127].)
 - 2) Artificial eye B (18530-G002) (See 8.2.2 [p126].)
- 2 . Set the distance between the tip of the air nozzle and artificial eye B (18530-G002) to 11 mm with the block (18504-M018) of the distance alignment rod (18504-1600).
- 3 . Using the NT-4 optical adjustment jig (18541-1019), align the center of the alignment spot to that of the optical reticle center circle.
- 4 . Attach block A (18504-M020) of the distance alignment rod (18504-1600) to the NT-4 optical adjustment jig (18541-1019) to set the distance between the tip of the air nozzle and artificial eye B (18530-G002) to 16 mm.
- 5 . Enter adjustment mode to select "4. OFFSET VOLTAGE" (see 8.1.1 [p119]).
- 6 . Press the reticle button  to delete the optical reticle.
- 7 . Press the start button to perform calibration.
- 8 . After the calibration is complete, confirm the following items.
 - 1) The calibration value is displayed.
 - 2) The calibration value is smaller when the distance between the tip of the air nozzle and artificial eye B (18530-G002) is 11 mm than when it is 16 mm.
- 9 . Confirm that the alignment spot is smaller than the center circle of the optical reticle and is inside the center circle.
- 10 . After the adjustment is complete, press the exit button  and turn off the power switch.
- 11 . Remove the jigs.
- 12 . Reassemble the removed covers and units in the reverse order.



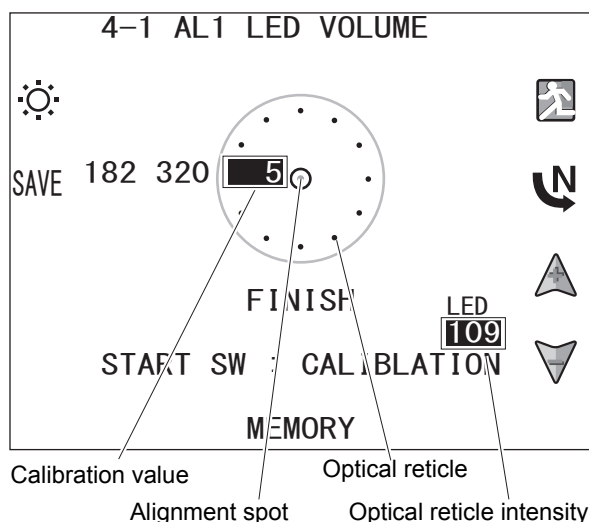
8.3.5.2 When using model eye (CL) (32961-0700)


- 1 . Attach the model eye (CL) (32961-0700)
- 2 . Enter adjustment mode to select "8. CAMERA2" (see 8.1.1 [p119]).
- 3 . Press the next button  to display "8-2AL2 LED BALANCE2".
- 4 . Align the model eye (CL) (32961-0700).
- 5 . Pull the measuring unit toward the operator so that the distance between the model eye (CL) (32961-0700) and air nozzle (A) is maximum.

 **Caution** Do not move the measuring unit to the left or right.



- 6 . Enter adjustment mode to select "4. OFF-SET VOLTAGE" (see 8.1.1 [p119]).
- 7 . Press the start button to perform calibration.
- 8 . After the calibration is complete, confirm the following items.
 - 1) The calibration value is displayed.
 - 2) When the measuring unit is moved close to the model eye (CL) (32961-0700) until the alignment spot becomes minimum, the calibration value decreases.

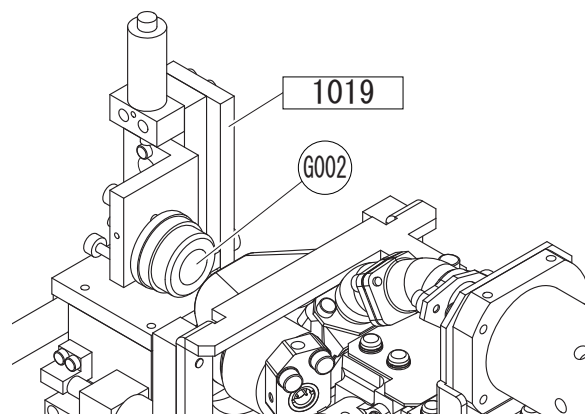



- 9 . After the adjustment is complete, press the exit button  and turn off the power switch.
- 10 . Remove the model eye (CL) (32961-0700).
- 11 . Reassemble the removed covers and units in the reverse order.

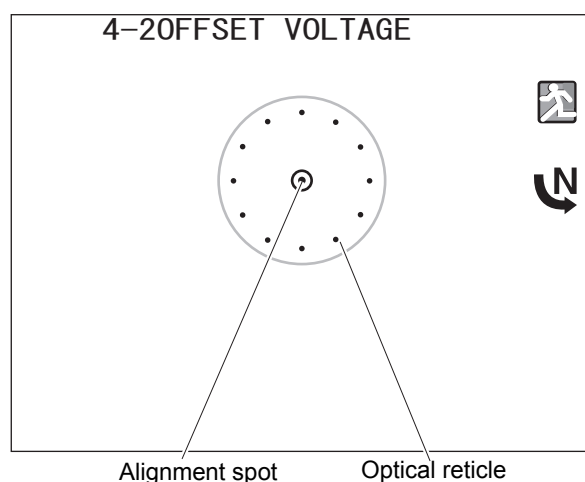
8.3.6 NT board

8.3.6.1 AL2 LED offset voltage

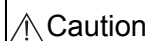
- 1 . Attach the following jigs.
 - 1) NT-4 optical adjustment jig (18541-1019) (See 8.2.3 [p127].)
 - 2) Artificial eye B (18530-G002) (See 8.2.2 [p126].)
- 2 . Set the distance between the tip of the air nozzle and artificial eye B (18530-G002) to 11 mm with the block (18504-M018) of the distance alignment rod (18504-1600).



- 3 . Using the NT-4 optical adjustment jig (18541-1019), align the center of the alignment spot to that of the optical reticle center circle.
- 4 . Enter adjustment mode to select "4. OFF-SET VOLTAGE" (see 8.1 [p119]).
- 5 . Press the next button  to display "4-2OFFSET VOLTAGE".
- 6 . Place a shading plate between the air nozzle and artificial eye B to prevent interference of the alignment spot illumination. Additionally, darken the room so that the adjustment is not affected by interference light.




- 7 . Turn VR1, VR2, VR3, and VR4 of the NT board (18536-BA21) fully counterclockwise.
- 8 . Connect P201 of the NT adjustment cable (32107-EA12) to J1 on the NT adjustment board (32107-BA02) and P2111 to J11 on the NT board (18536-BA21).
- 9 . Adjust VR3 and VR4 on the NT board (18536-BA21) by the following procedure.
 - 1) VR3: Turn VR3 clockwise as much as possible within the range that the VR3 upper and lower LEDs on the NT adjustment board (32107-BA02) do not light up.
 - 2) VR4: Turn VR4 clockwise as much as possible within the range that the VR4 upper and lower LEDs on the NT adjustment board (32107-BA02) do not light up.




Caution

Do not turn off the LEDs by turning VRs clockwise further.
Prevent the influence of the interference light.

10. Remove the shading plate placed between the air nozzle and artificial eye B.
11. Press the next button  to perform the following.



Note

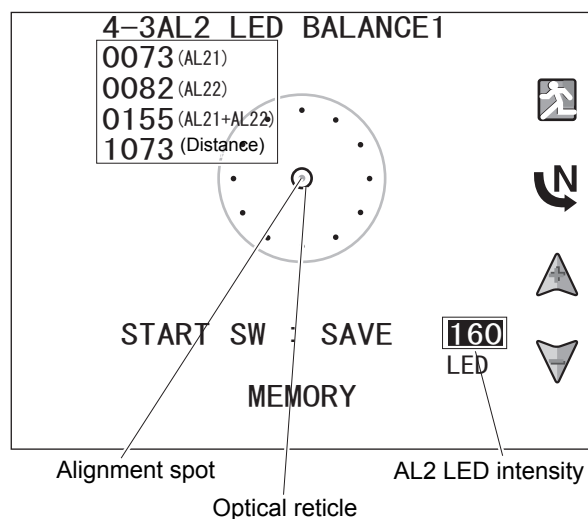
Pressing the next button  displays the 4-3AL2 LED BALANCE1 screen.

- 1) AL2 LED balance (See 8.3.6.2 [p142].)

8.3.6.2 AL2 LED balance

Caution Perform the AL2 LED balance adjustment in a darkened room.

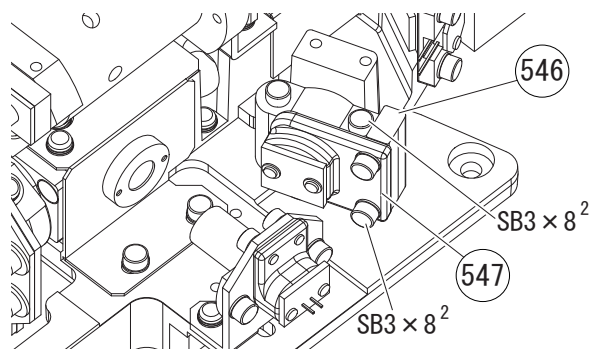
- 1 . Using the NT-4 optical adjustment jig (18541-1019), align the center of the alignment spot to that of the optical reticle center circle.



- 2 . Confirm the AL21, AL22, and distance values by the following procedure.

- 1) Loosen SB3 \times 8 ($n = 2$).
- 2) Adjust the position of adapter PSD (15601-M547) to set the AL21, AL22, and distance values as shown below.

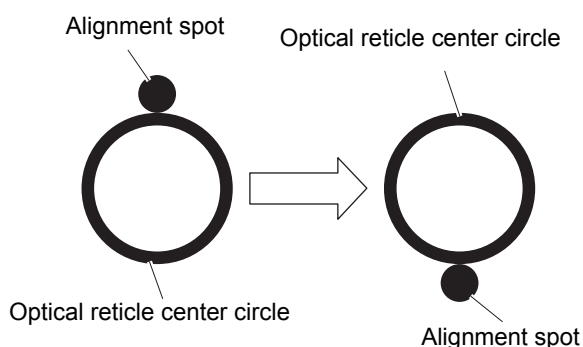
- a . AL21, AL22: Same value
- b . Distance: 1100






- 3) Move the alignment spot with the Y axis micro stage of the NT-4 optical adjustment jig (18541-1019) so that it visually comes into contact with the outer top and bottom of the optical reticle center circle.

- 4) Confirm that the AL21, AL22, and distance values are as below.
- a . AL21, AL22: Same value (The difference between AL21 and AL22 is 5 or less.)
- b . Distance: 1100

- 5) Repeat from Step 3) until the above values are obtained.

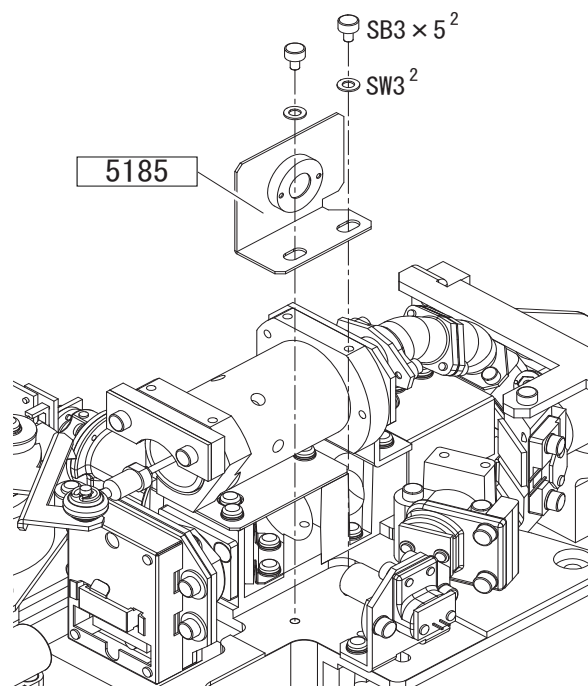


- 3 . Adjust the AL2 intensity with the up+ button  and down- button  and set the AL21 and AL22 values to 130. Then, press the start button.
- 4 . Set the AL21 and AL22 values with VR1 and VR2 on the NT board (18536-BA21) as shown below.
 - 1) VR1: Set the AL21 value to 150.
 - 2) VR2: Set the AL22 value to 150.
- 5 . After the adjustment is complete, press the exit button  and turn off the power switch.
- 6 . Remove the jig.
- 7 . Reassemble the removed covers and units in the reverse order.

8.3.7 Fixation light position

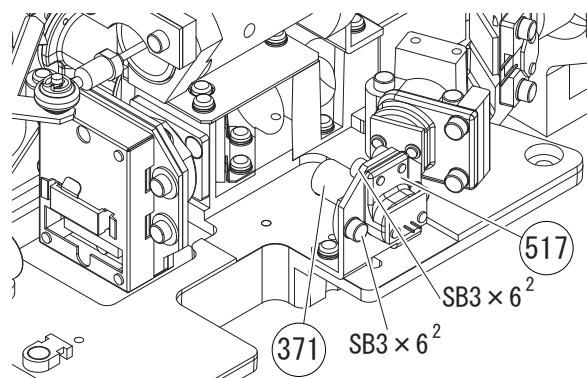
8.3.7.1 NT-510/NT-530 fixation light

- 1 . Enter adjustment mode to select "5. FIX OPTICS AXIS" (see 8.1.1 [p119]).
- 2 . Unscrew SB3 × 5 (n = 2) and SW3 (n = 2) to remove the fixation light pinhole (18536-5185).



- 3 . Adjust the position of the holder (15601-M517) by the following procedure.

- 1) Loosen SB3 × 6 (n = 2) to adjust the position of the pinhole holder (18525-M371) so that the fixation LED (18536-EA26) can be seen through the hole of the air nozzle.
- 2) Loosen SB3 × 6 (n = 2) to adjust the position of the holder (15601-M517) so that the internal reflection of the air nozzle disappears.
- 3) Repeat the adjustment until the internal reflection of the air nozzle disappears.





- 4 . Attach the fixation light pinhole (18536-5185) with SB3 × 5 (n = 2) and SW3 (n = 2) so that obscuration, flare, or ghost image of the fixation LED (18536-EA26) does not occur.
- 5 . If obscuration occurs, perform adjustment using the fixation light pinhole (18536-5185) by the following procedure.
 - 1) Adjust the height of the pinhole holder (18525-M371) so that the light passes through around the center of the convex lens (18505-G011).
 - 2) Loosen SB3 × 6 (n = 2) to adjust the position of the holder (15601-M517) so that the internal reflection of the air nozzle disappears.
- 6 . Confirm the following items.
 - 1) Too much flare is not seen.
 - 2) The deviation of the fixation light is almost uniform from whatever angle viewed through the air nozzle.
 - 3) No adherence of dirt or dust
 - 4) The brightness of fixation light is uniform.

7 . If any ghost image appears, perform adjustment by the following procedure.


1) Enter adjustment mode to select "5. FIX OPTICS AXIS" ([see 8.1.1 \[p119\]](#)).

2) Perform adjustment with the up+

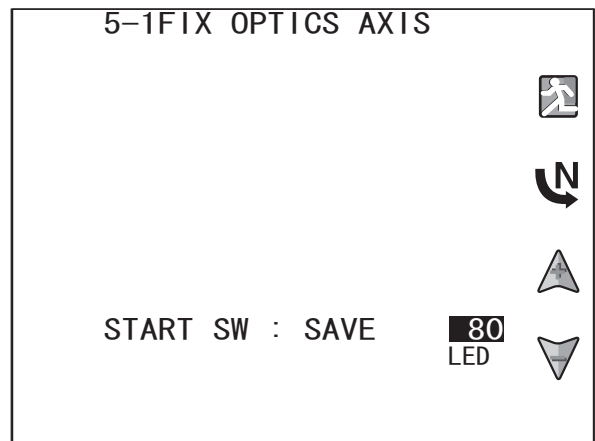
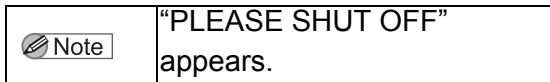
button  or down- button  so that no ghost image appears.

3) Press the start button to save the setting.

8 . After the adjustment is complete, press

the next button .




9 . The 5. FINISH screen is displayed.




10. Turn off the power switch.

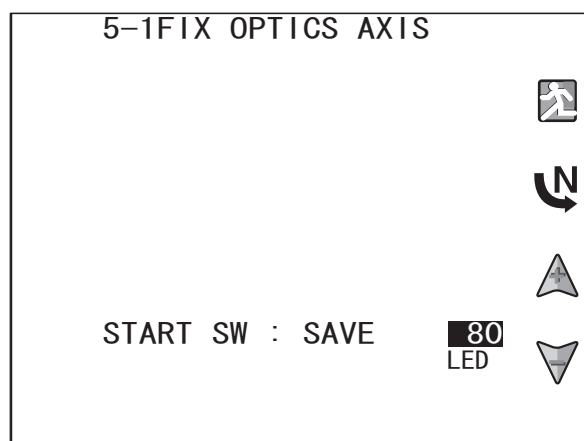
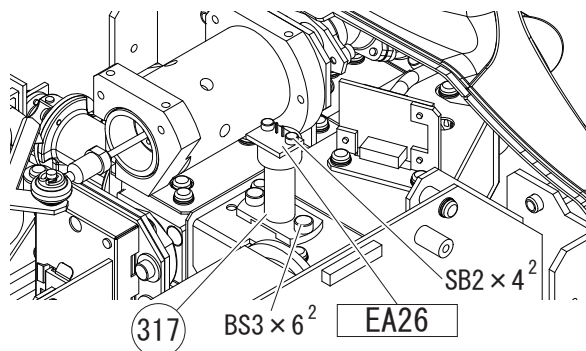
11. Reassemble the removed covers and units in the reverse order.

8.3.7.2 NT-530P fixation light

- 1 . Enter adjustment mode to select "5. FIX OPTICS AXIS" (see 8.1.1 [p119]).
- 2 . Adjust the position of the LED holder (18538-M317) by the following procedure.
 - 1) Loosen SB3 × 6 (n = 2) to adjust the position of the LED holder (18538-M317) so that the fixation LED (18536-EA26) can be seen through the hole of the air nozzle.
 - 2) Loosen SB2 × 4 (n = 2) to adjust the position of the fixation LED (18536-EA26) so that the light becomes the brightest.
 - 3) Loosen SB3 × 6 (n = 2) to adjust the position of the LED holder (18538-M317) so that the internal reflection of the air nozzle disappears.
 - 4) Repeat Step 2 until the internal reflection of the air nozzle disappears.
- 3 . Confirm the following items.
 - 1) Too much flare is not seen.
 - 2) The deviation of the fixation light is almost uniform from whatever angle viewed through the air nozzle.
 - 3) No adherence of dirt or dust
 - 4) The brightness of fixation light is uniform.
- 4 . If any ghost image appears, perform adjustment by the following procedure.
 - 1) Enter adjustment mode to select "5. FIX OPTICS AXIS" (see 8.1.1 [p119]).
 - 2) Perform adjustment with the up+ button  or down- button  so that no ghost image appears.
 - 3) Press the start button to save the setting.
- 5 . After the adjustment is complete, press the next button .
- 6 . The 5. FINISH screen is displayed.


 Note

"PLEASE SHUT OFF" appears.
- 7 . Turn off the power switch.
- 8 . Reassemble the removed covers and units in the reverse order.






8.3.8 Solenoid brake

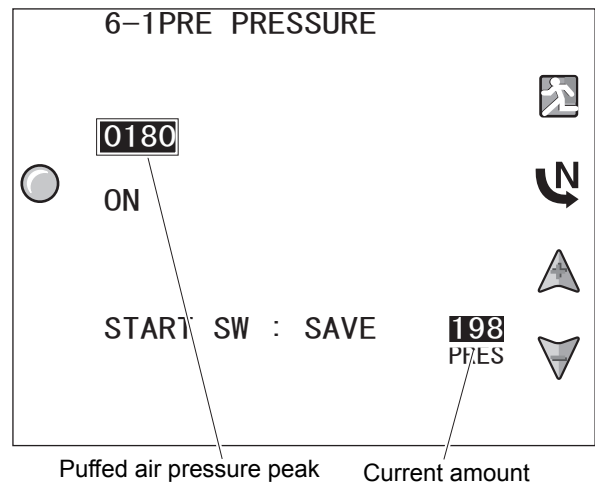
1 . Enter adjustment mode to select “6. SOLENOID” (see 8.1.1 [p119]).


2 . Press the execute button  to display “ON”.

3 . Adjust the amount of the current that flows through the solenoid with the up+ button

 or down- button  so that the puffed air pressure peak is 180 ± 3 .

4 . Press the next button  to display “6-2SOLENOID BRAKE”.

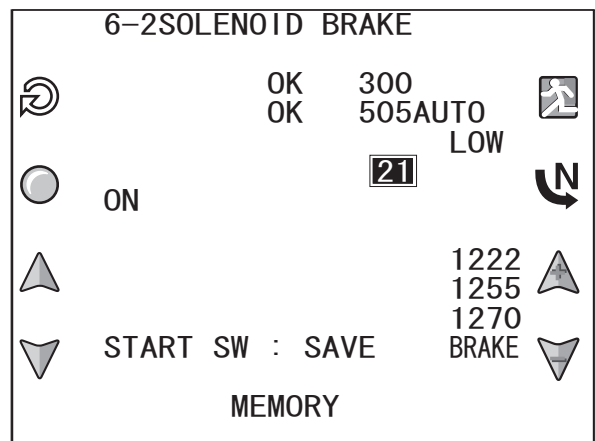


5 . Press the execute button  to display “ON” and perform calibration.


6 . Make sure that “NG” is not displayed.

7 . Press the start button to save the setting.


8 . Press the exit button  and turn off the power switch.




8.3.9 Puffed air pressure

 **Caution** Perform adjustment in a darkened room so that the values do not vary due to interference light.

1 . Enter adjustment mode to select “6. SOLENOID” (see 8.1.1 [p119]).



2 . Press the next button  to display “6-2SOLENOID BRAKE”.

3 . Press the next button  to display “6-3PRESSURE”.

4 . Adjust the values of the puffed air pressure peak and angle when the measurement range is set to 40 and 60 by the following procedure.

1) Press the RNG button to set the measurement range to 40.

2) Adjust the amount of the current that flows through the solenoid with the



up+ button  or down- button  to set the values of the puffed air pressure peak and angle as shown below.

a . Pressure peak: 130 ± 10

b . Puffed air pressure angle: 240 ± 10

3) Press the RNG button to set the measurement range to 60.


4) Adjust the amount of the current that flows through the solenoid with the up+ button

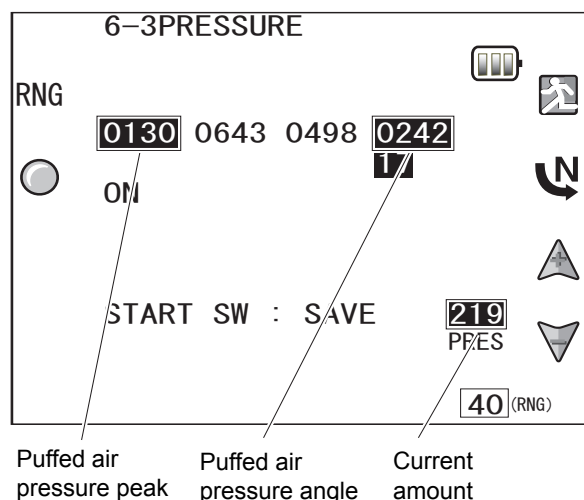
 or down- button  to set the values of the puffed air pressure peak and angle as shown below.

a . Pressure peak: 180 ± 10

b . Puffed air pressure angle: 190 ± 10

5 . Press the start button to save the settings.


6 . After the adjustment is complete, press the exit button  and turn off the power switch.





8.3.10 Reference marker position


1 . Enter adjustment mode to select “7. APL CENTER” (see 8.1 [p119]).


2 . Align the reference marker to the center of the optical reticle center circle with the following buttons.

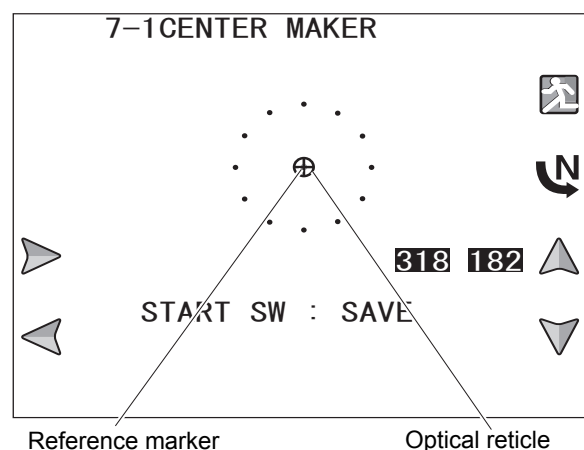
1) Up button 

2) Down button 


3) Left button 

4) Right button 

 **Note** The reference marker moves in synchronization with the optical reticle.




3 . Press the start button to save the setting.


4 . After the adjustment is complete, press the exit button  and turn off the power switch.

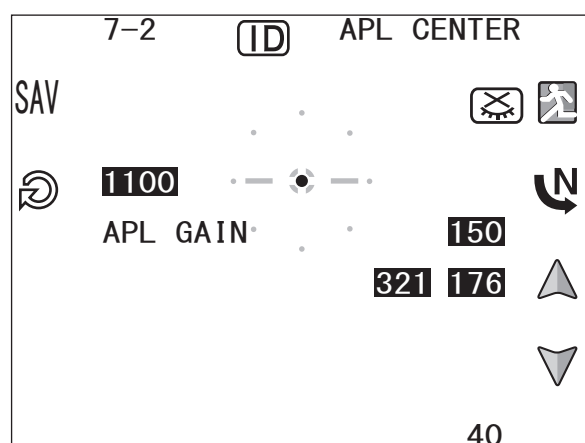
8.3.11 Applanation detector

- 1 . Attach the following jigs.
 - 1) Chinrest attachment jig (32107-1100) ([See 8.2.4 \[p128\].](#))
 - 2) Chinrest attachment joint (32107-2100) ([See 8.2.5 \[p128\].](#))
- 2 . Attach any of the following model eyes to the chinrest attachment joint (32107-2100).
 - 1) Triple calibration model eye (18512-0210) ([See 8.2.6.2 \[p131\].](#))
 - 2) Triple calibration model eye (with calibration certificate) (18512-0211) ([See 8.2.6.2 \[p131\].](#))
 - 3) Single calibration model eye (medium pressure [18512-0120]) ([See 8.2.6.3 \[p132\].](#))
 - 4) Single calibration model eye (medium pressure, with calibration certificate [18512-0111]) ([See 8.2.6.3 \[p132\].](#))
- 3 . Enter adjustment mode to select "7. APL CENTER" ([see 8.1 \[p119\].](#)).

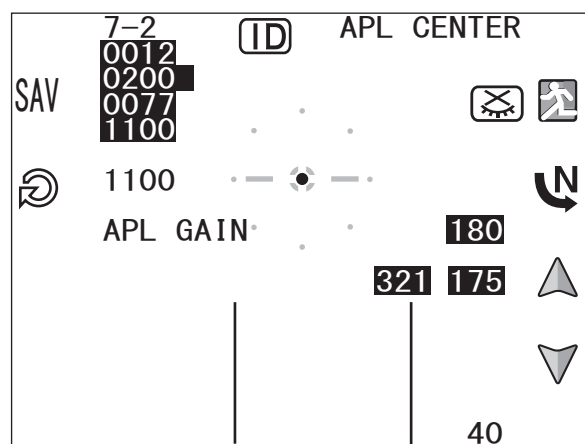
- 4 . Press the next button  to display "7-2 APL CENTER".

- 5 . Align the medium pressure silicon model eye.



 Note	Confirm that the electronic reticle becomes yellow.
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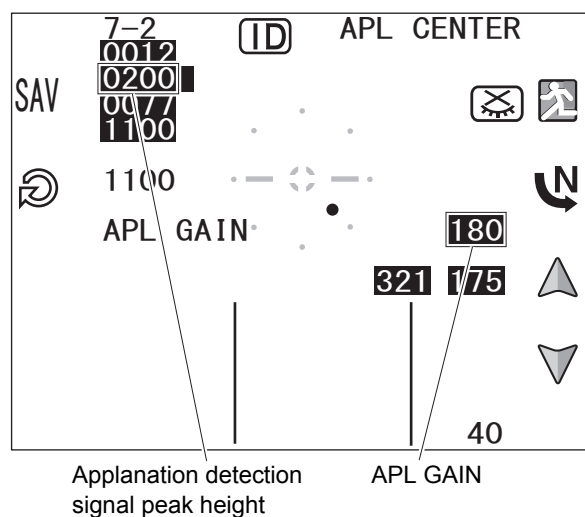



- 6 . Press the start button to measure the medium pressure silicon model eye.









- 7 . When measuring the silicon model eye, align it to the position where the applanation detection signal peak height is maximum (applanation center).

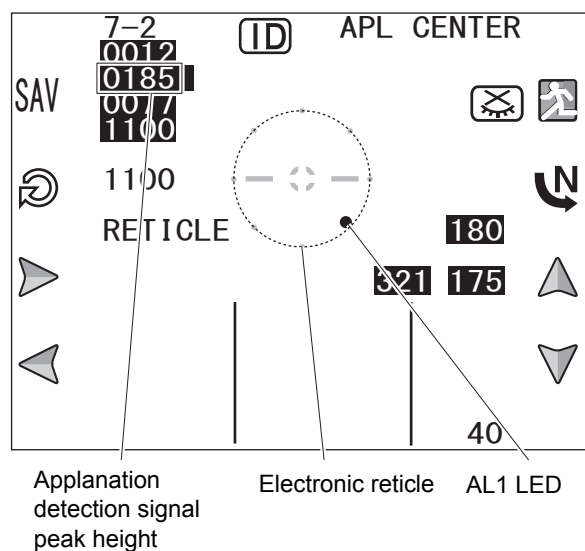
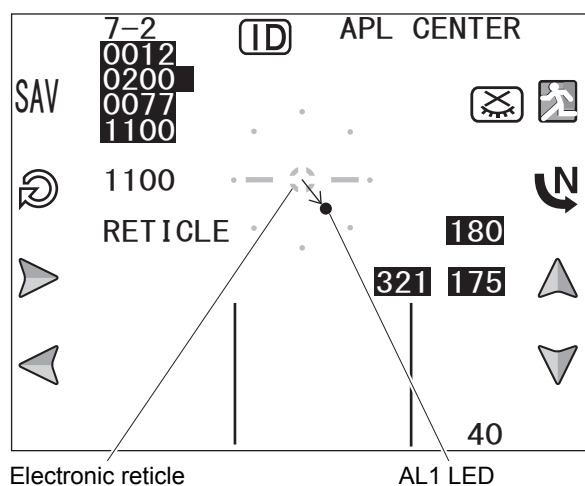
- 8 . Adjust "APL GAIN" with the up button  or down button  so that the value of the applanation detection signal peak height is about 200.




- 9 . Press the reset button  to change "APL GAIN" to "RETICLE".
10. Adjust the position of electronic reticle using the following buttons so that AL1 LED is aligned to the center of the electronic reticle.

- 1) Up button 
- 2) Down button 
- 3) Left button 
- 4) Right button 

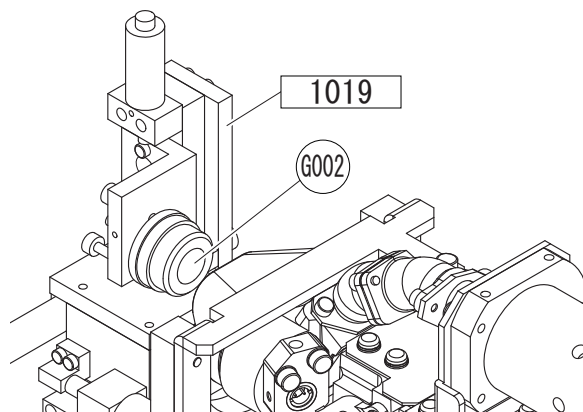
11. Confirm that when AL1 LED comes into contact with the inner side of the electronic reticle circle, the value of the applanation detection signal peak height is no more than 20 less than its maximum value.
12. Press the SAVE button  to save the setting.
13. Press the exit button  and turn off the power switch.




8.3.12 Focusing indicator check

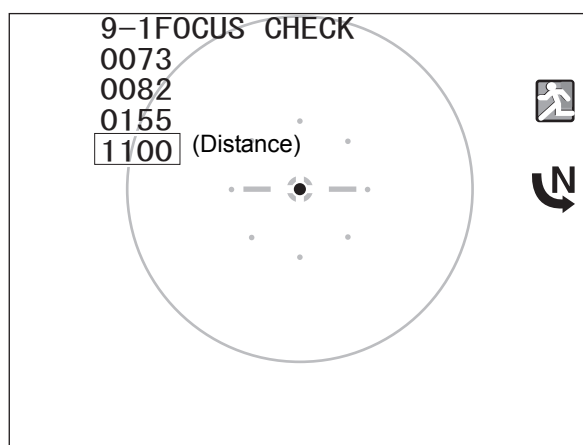
 **Caution** Perform this task in a darkened room.


- 1 . Attach the following jigs.
 - 1) NT-4 optical adjustment jig (18541-1019) (See 8.2.3 [p127].)
 - 2) Artificial eye B (18530-G002) (See 8.2.2 [p126].)
- 2 . Enter adjustment mode to select "9. FOCUS CHECK" (see 8.1.1 [p119]).

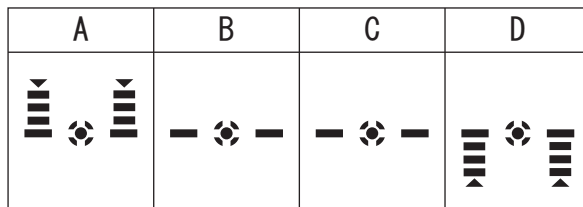


- 3 . Move the Z axis micro stage of the NT-4 optical adjustment jig (18541-1019) and read the Z axis micrometer values when the focusing indicator shows the following states.

 Note	When reading the micrometer, always turn the micrometer in the direction that the micro stage moves from the far to the near.
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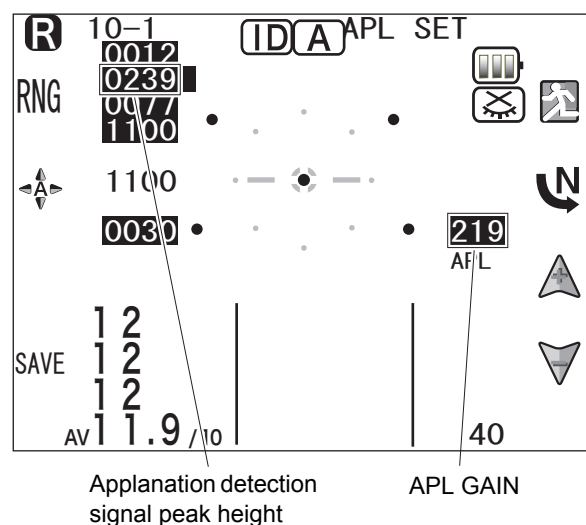
- 1) Z: The micrometer value when the distance value on the screen is 1100.
 - 2) A: The position when the triangle indicators start to blink.
 - 3) B: The position when the focusing indicator aligned from the A position appears as a single line and blinks in yellow.
 - 4) C: The position when the focus indicator appears as a single line and blinks in yellow when the micrometer is turned in the same direction from the B position.
 - 5) D: The position when the triangle indicators start to blink.
- 4 . Confirm that the measurement values are within the following specifications.
 - 1) Z-A: -2.8 to -4.0 mm
 - 2) Z-B: -0.1 to -0.2 mm
 - 3) Z-C: 0.1 to 0.2mm
 - 4) Z-D: 2.8 to 4.0mm
 - 5) Display range: ± 2.8 to ± 4.0 mm
 - 6) Start range -0.2 to 0.2 (design value: ± 0.15)
 - 5 . If they are not, adjust the NT board (see 8.3.6 [p141]).
 - 6 . After the adjustment is complete, press the exit button  and turn off the power switch.
 - 7 . Remove the jigs.
 - 8 . Reassemble the removed covers and units in the reverse order.



8.3.13 Model eye measurements


8.3.13.1 Silicon model eye

- 1 . Attach the following jigs.
 - 1) Chinrest attachment jig (32107-1100) ([See 8.2.4 \[p128\].](#))
 - 2) Chinrest attachment joint (32107-2100) ([See 8.2.5 \[p128\].](#))
- 2 . Attach any of the following model eyes.
 - 1) Triple calibration model eye (18512-0210) ([See 8.2.6.2 \[p131\].](#))
 - 2) Triple calibration model eye (with calibration certificate [18512-0211]) ([See 8.2.6.2 \[p131\].](#))
 - 3) Single calibration model eye (low pressure [18512-0120]) ([See 8.2.6.3 \[p132\].](#))
 - 4) Single calibration model eye (low pressure, with calibration certificate [18512-0121]) ([See 8.2.6.3 \[p132\].](#))
- 3 . Enter adjustment mode to select "10. INPUT CONST" ([see 8.1.1 \[p119\].](#)).
- 4 . Press the auto button to set the auto-tracking function to 1D and auto shot function to ON.
- 5 . Measure the low pressure model eye and align to the position where the applanation detection signal peak height is maximum.
- 6 . Measure the low pressure model eye for ten consecutive times. Confirm that the applanation detection signal peak height is the low pressure model eye calibration value ± 10 .
- 7 . If it is not, perform adjustment by the following procedure.
 - 1) Adjust APL GAIN with the up+ button  or down- button  so that the low pressure model eye calibration value is ± 10 .
 - 2) Press the SAVE button to save the setting of APL GAIN.
- 8 . Attach the following model eyes to the chinrest attachment joint (32107-2100).
 - 1) Triple calibration model eye (18512-0210) ([See 8.2.6.2 \[p131\].](#))
 - 2) Triple calibration model eye (with calibration certificate [18512-0211]) ([See 8.2.6.2 \[p131\].](#))
 - 3) Single calibration model eye (medium pressure [18512-0110]) ([See 8.2.6.3 \[p132\].](#))
 - 4) Single calibration model eye (medium pressure, with calibration certificate [18512-0111]) ([See 8.2.6.3 \[p132\].](#))
 - 5) Single calibration model eye (low pressure [18512-0120]) ([See 8.2.6.3 \[p132\].](#))
 - 6) Single calibration model eye (low pressure, with calibration certificate [18512-0121]) ([See 8.2.6.3 \[p132\].](#))
 - 7) Single calibration model eye (high pressure [18512-0130]) ([See 8.2.6.3 \[p132\].](#))
 - 8) Single calibration model eye (high pressure, with calibration certificate) (18512-0131) ([See 8.2.6.3 \[p132\].](#))



- 9 . Confirm that the average value of the ten measurements for each low, medium, or high pressure model eye satisfies the measurement accuracy.


Measurement range	Measurement accuracy	Reproducibility (Standard Deviation [SD])
1 to 29 mmHg	Nominal value of silicon model eye: ± 1.5 mmHg	Within 1 mmHg
30 to 60 mmHg	Nominal value of silicon model eye: ± 2.5 mmHg	Within 2 mmHg

 Note	<p>When the IOP set value is less than 30 mmHg, set the measurement range to 40.</p> <p>When the IOP set value is 30 mmHg or more, set the measurement range to 60.</p>
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10. After the confirmation, remove the jigs.

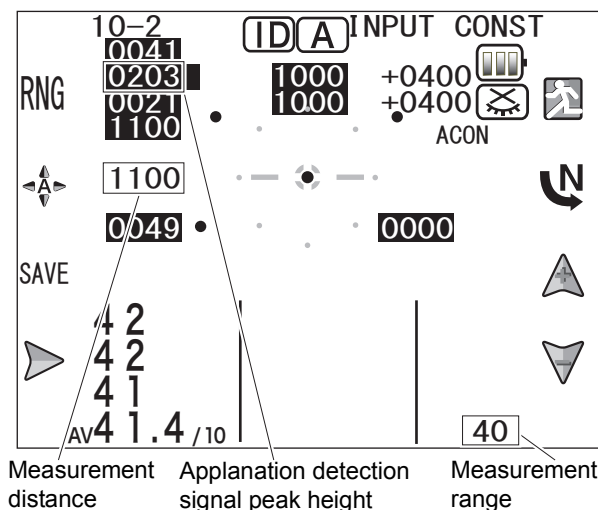
8.3.13.2 Electric model eye

- 1 . Attach the following jigs.
 - 1) Chinrest attachment jig (32107-1100) (See 8.2.4 [p128].)
 - 2) Chinrest attachment joint (32107-2100) (See 8.2.5 [p128].)
 - 3) Electric model eye (See 8.2.6.1 [p129].)
- 2 . Enter adjustment mode to select "10. INPUT CONST" (see 8.1.1 [p119]).


- 3 . Press the auto button  to set the auto-tracking function to 1D and auto shot function to ON.

- 4 . Press the next button  to display "10-2 INPUT CONST".

- 5 . Press the RNG button to set the measurement range to 40.




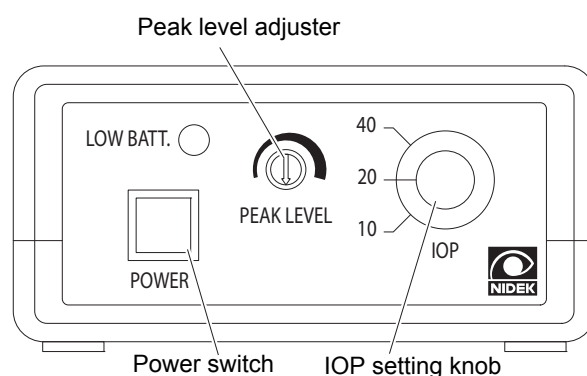
- 6 . Turn on power to the electric model eye, then align the IOP setting knob to 10 mmHg.

 The electric model eye (18512-0310) is used in the illustration.

- 7 . Aligning the electric model eye starts the measurement automatically.
- 8 . Confirm that values indicated on the screen are as shown below.


- 1) Measurement distance: 1097 to 1103
- 2) Applanation detection signal peak height: 200 ± 20

 If the applanation detection signal peak height is significantly out of the specified range, adjust it with the peak level adjuster (PEAK LEVEL) of the electric model eye main body.




- 9 . Confirm that the average value of the ten measurements for each IOP set value satisfies the measurement accuracy.

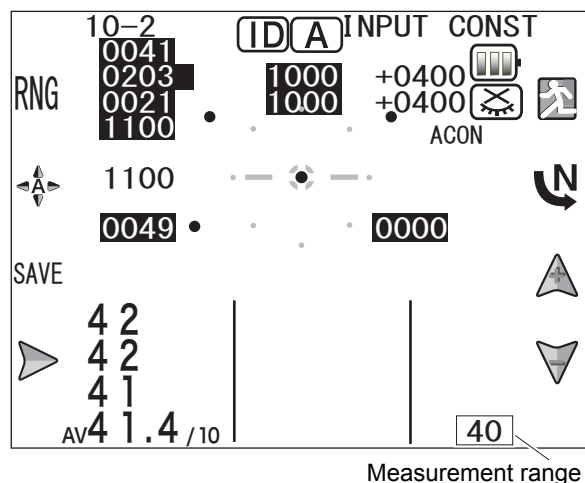
IOP set value	Measurement accuracy	Reproducibility (Standard Deviation [SD])
10 mmHg	10 ± 1 mmHg	1 mmHg or less
20 mmHg	20 ± 1 mmHg	1 mmHg or less
40 mmHg	40 ± 2 mmHg	2 mmHg or less

 If the IOP set value is less than 30 mmHg, set the measurement to 40.
If the IOP set value is 30 mmHg or more, set the measurement range to 60.


10. After the confirmation, remove the jigs.

8.3.14 A/B constant

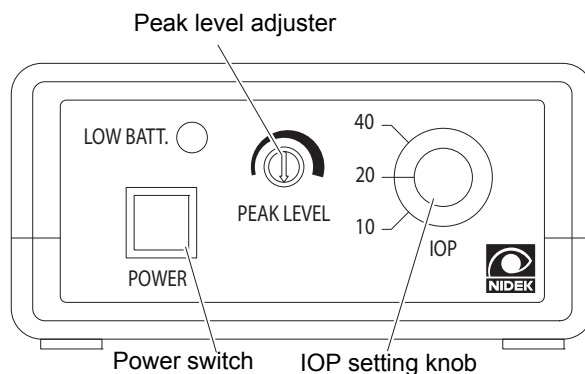
- 1 . Attach the following jigs.
 - 1) Chinrest attachment jig (32107-1100) (See 8.2.4 [p128].)
 - 2) Chinrest attachment joint (32107-2100) (See 8.2.5 [p128].)
 - 3) Electric model eye (See 8.2.6.1 [p129].)
- 2 . Enter adjustment mode to select "10. INPUT CONST" (see 8.1.1 [p119]).
- 3 . Press the next button  to display "10-2 INPUT CONST".
- 4 . Press the auto button to set the auto-tracking function to 1D and auto shot function to ON.
- 5 . Press the RNG button to set the measurement range to 40.



- 6 . Turn on power to the electric model eye, then align the IOP setting knob to 10 mmHg.


 **Note** The electric model eye (18512-0310) is used in the illustration.

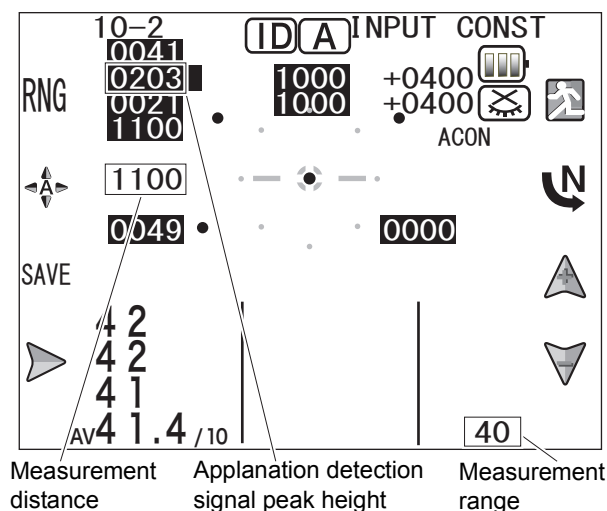
- 7 . Aligning the electric model eye starts the measurement automatically.



- 8 . Confirm that values indicated on the screen are as shown below.

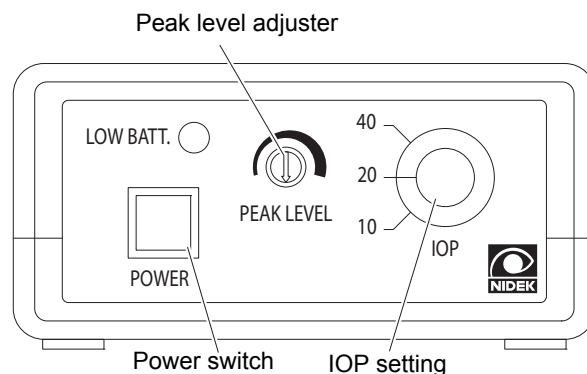
- 1) Measurement distance: 1097 to 1103
- 2) Applanation detection signal peak height: 200 ± 20

 **Note** If the applanation detection signal peak height is significantly out of the specified range, adjust it with the peak level adjuster (PEAK LEVEL) of the electric model eye main body.



9 . Following the procedure below, set the A and B constants so that the measurement accuracy of the electric model eye is satisfied.

- 1) Turn on power to the electric model eye, then align the IOP setting knob to 10 mmHg or 20 mmHg.



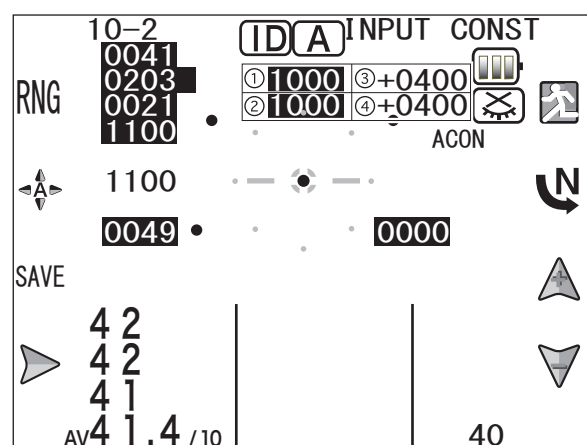
- 2) Press the RNG button to set the measurement range to 40.

- 3) Adjust the A constant.

- a . Select the A constant value

with the right button ➡.

<p>Note</p>	<p>ACON60 and ACON40 are selected simultaneously.</p>
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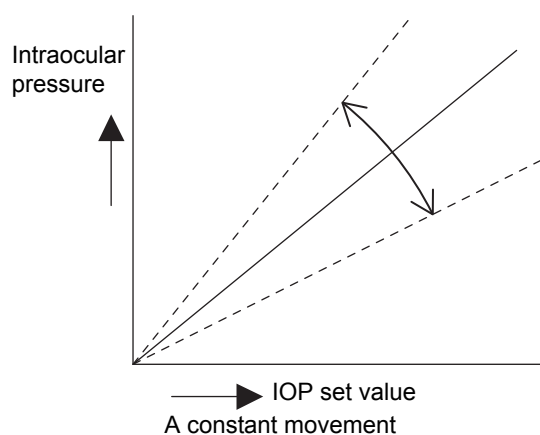
- b . Press the up+ button ▲ or down- button ▼ to change the ACON60 and ACON40 values.

No.	Item	No.	Item
1	ACON40	3	BCON40
2	ACON60	4	BCON60

Note The ACON60 and ACON40 values become the same.

- c . Changing the A constant value changes the intraocular pressure measurement value as shown in the graph to the right.

<p>Note</p>	<p>To increase the intraocular pressure measurement value by 1, change the A constant value in about 5 to 10 increments.</p>
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


4) Adjust the B constant.


- a . Select the B constant value with the right button ➤.

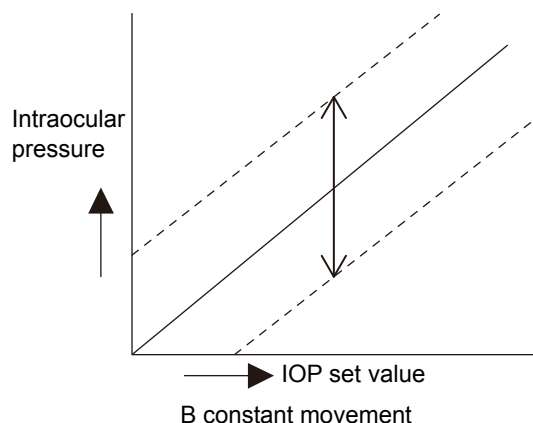
 Note BCON60 and BCON40 are selected simultaneously.

- b . Press the up+ button ▲ or down- button ▼ to change the BCON60 and BCON40 values.

 Note The BCON60 and BCON40 values become the same.

- c . Changing the B constant value changes the intraocular pressure measurement value as shown in the graph to the right.

 Note Change the B constant value in about 500 increments.



10. Set the measurement range and IOP set values of the electric model eye as shown below. Confirm that the average value of the ten measurements for each IOP set value satisfies the measurement accuracy.

Measurement range	IOP set value	Measurement accuracy	Reproducibility (Standard Deviation [SD])
40	10 mmHg	10 ±1 mmHg	1 mmHg or less
40	20 mmHg	20 ±1 mmHg	1 mmHg or less
60	40 mmHg	40 ±2 mmHg	2 mmHg or less

11. When setting the measurement range to 60 and IOP set value to 40 mmHg as above does not satisfy the measurement accuracy, change the ACON60 and BCON60 values only by the following procedure.

- 1) Press and hold the right button ➤.

- 2) Select the ACON60 or BCON60 value with the right button ➤.

- 3) Press the up+ button ▲ or down- button ▼ to change the ACON60 or BCON60 value.

- 4) Reconfirm that the measurement accuracy for each setting is satisfied.

12. Press the SAVE button to save the setting.

13. Perform the following.

- 1) EEPROM Backup (See 8.8 [p198].)

14. Remove the jigs.

8.4 Pachymeter Adjustment

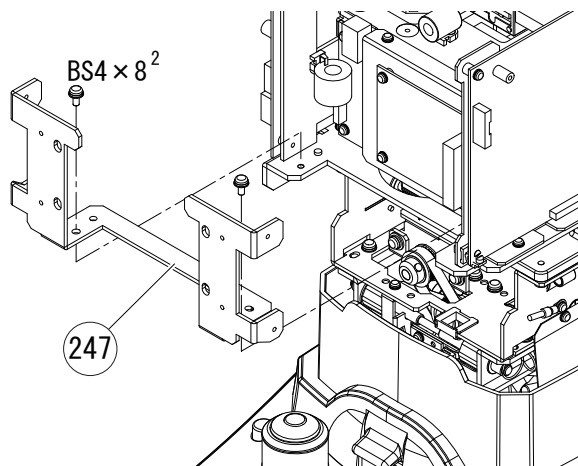
 Caution NT-530P only

8.4.1 Pachy illumination ASSY

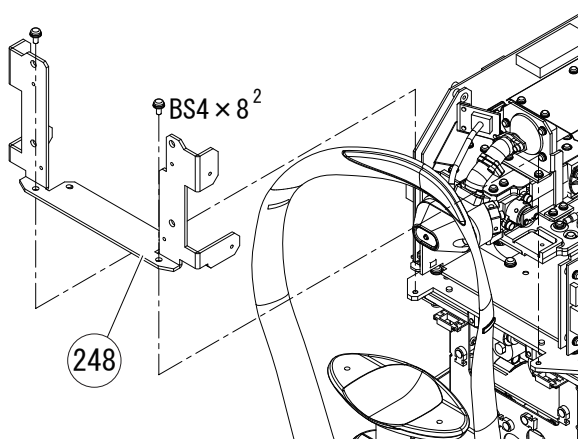
8.4.1.1 PACHY

1 . Prepare the adjustment by the following procedure.

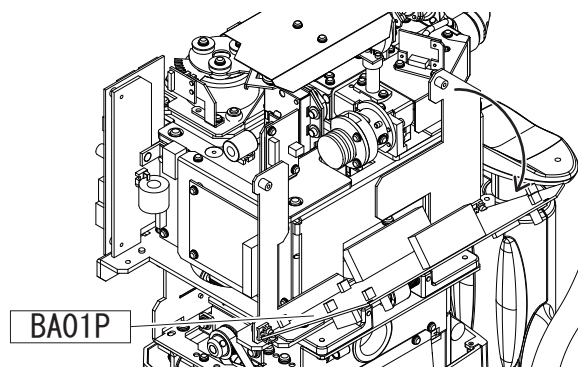
- 1) Remove the measuring unit rear cover ASSY (18536-6000) (see 6.3 [p68]).
- 2) Remove the measuring unit front cover ASSY (18538-6300) for the NT-530P. (see 6.4 [p69]).
- 3) Unscrew BS4 × 8 (n = 2) to remove the rear cover bracket (18536-M247).



- 4) Unscrew BS4 × 8 (n = 2) to remove the front cover bracket (18536-M248).



- 5) Unscrew BS3 × 6 (n = 2) to tilt the main board (18538-BA01P).
- 6) Attach the measuring unit rear cover ASSY (18536-6000) to the LCD securing jig (18541-1028) (for the NT-510/530) and connect it to the main board (18538-BA01P).



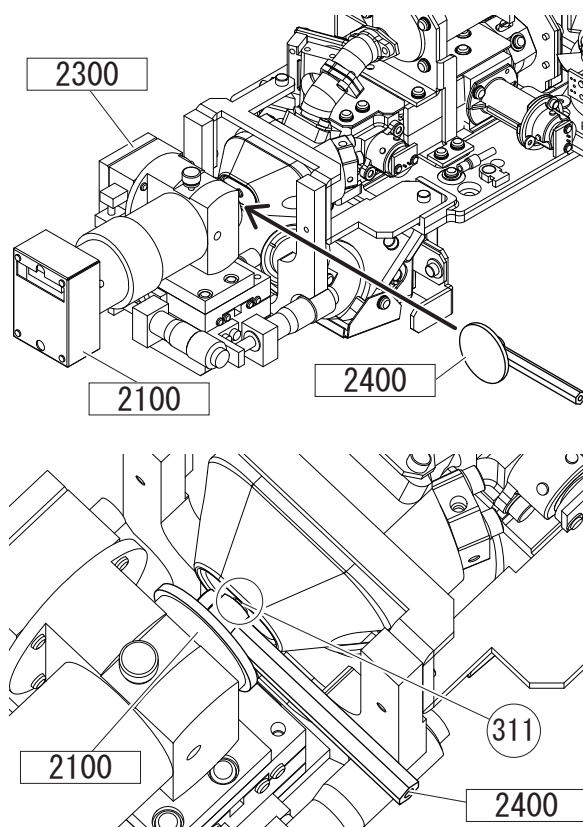
2 . Attach the following jigs.

- 1) NT-5P optical adjustment jig (18570-2300) (See 8.2.7.1 [p133].)
- 2) Pachy phototransmitter adjustment jig (18570-2100) (See 8.2.7.2 [p133].)

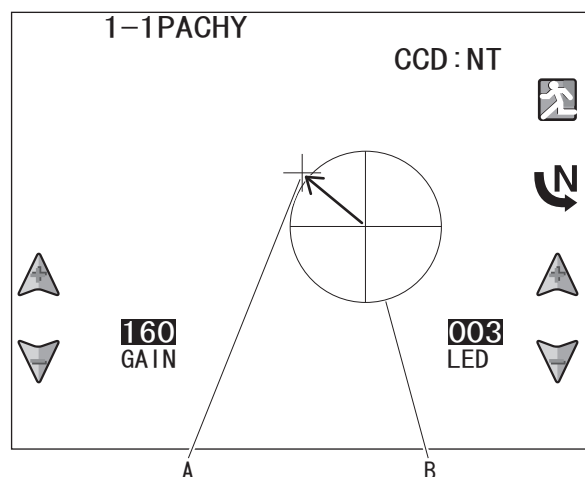
- 3 . Set the distance between the air nozzle (18515-M311) and the pachy transmitter adjustment jig (18570-2100) to 11 mm with the distance alignment jig (18570-2400).



Face the larger surface of the disc for the distance alignment jig (18570-2400) toward the pachy phototransmitter adjustment jig (18570-2100).






- 4 . Enter pachy adjustment mode to select "1. PACHY" (see 8.1.2 [p120]).
- 5 . Using the pachy phototransmitter adjustment jig (18570-2100), align the reticle cross (B) of the jig to the center of the green cross (A) on the screen.
- 6 . If the green cross (A) and reticle cross (B) of the pachy phototransmitter adjustment jig (18570-2100) are not seen clearly, perform adjustment using the following buttons.



- 1) Adjust the CCD camera GAIN with

the up+ button  or down- button

 to the left of the screen.

- 2) Adjust the LED intensity with the up+ button  or down- button  to the right of the screen.


- 7 . Press the next button  to perform the following.




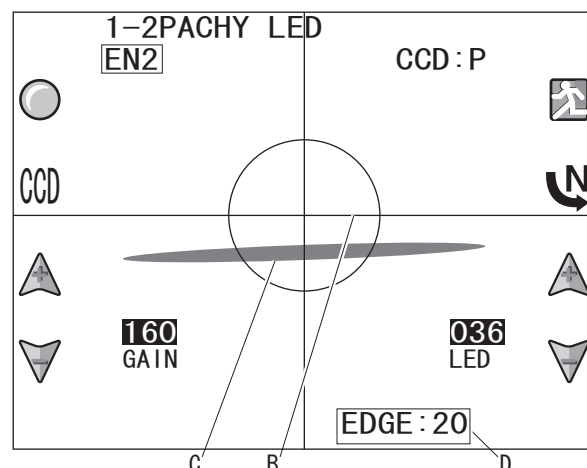
Pressing the next button  displays the 1-2PACHY LED screen

- 1) PACHY LED (See 8.4.1.2 [p159].)

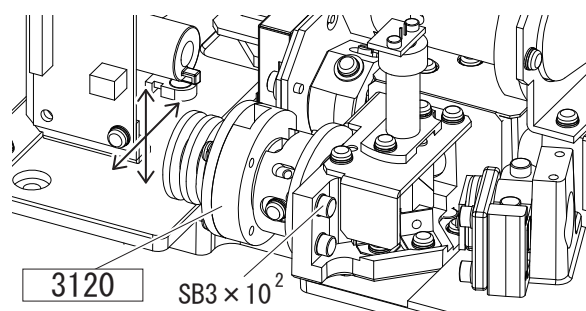
8.4.1.2 PACHY LED

- 1 . Press the execute button  to switch "OFF" to "EN2".

 Note	The slit (C) is displayed.
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- 2 . If the slit (C) is not displayed, loosen SB3 \times 10 (n = 2) to adjust the position of the pachy illumination ASSY (18538-3120).




- 3 . Adjust the focus of the pachy illumination ASSY (18538-3120) by the following procedure.

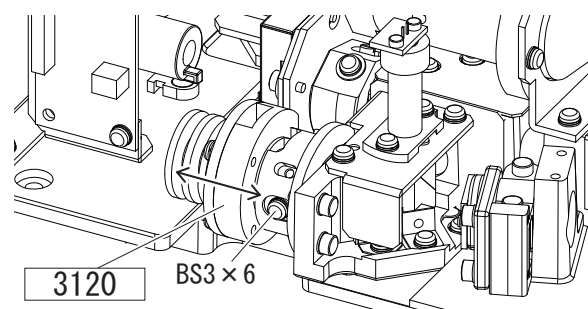
- 1) If the horizontal line (B) of the reticle cross for the pachy phototransmitter adjustment jig (18570-2100) and slit (C) are overlapping, move the slit up or down with the NT-5P optical adjustment jig (18570-2300).
- 2) If the slit (C) is not seen clearly, perform adjustment by the following procedure.

- a . Adjust the CCD camera GAIN with the up+ button  or down- button  to the left of the screen.
- b . Adjust the LED intensity with the up+ button  or down- button  to the right of the screen.

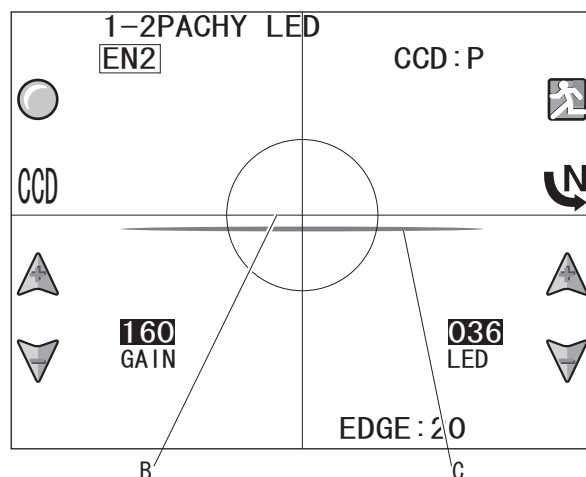
 Note	The EDGE value (D) changes according to the adjusted GAIN of CCD camera and LED intensity. "LED OVER" must not be displayed in the D area.
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- 3) Loosen BS3 \times 6 to adjust the focus of the pachy illumination ASSY (18538-3120) so that the EDGE value (D) becomes maximum.

 Note	When the EDGE value (D) becomes maximum, the slit (C) is the longest.
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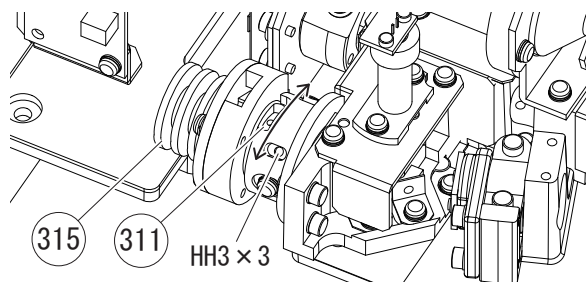



- 4) Loosen HH3 × 3 to turn the lens holder (18538-M311) so that the horizontal line (B) of the reticle cross for the pachy phototransmitter adjustment jig (18570-2100) and slit (C) are parallel.



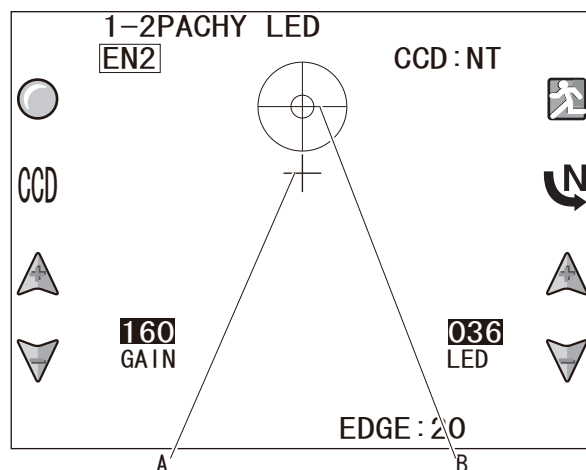
- 5) After the adjustment, tighten HH3 × 3 temporarily.

Caution For readjustment, do not tighten HH3 × securely.



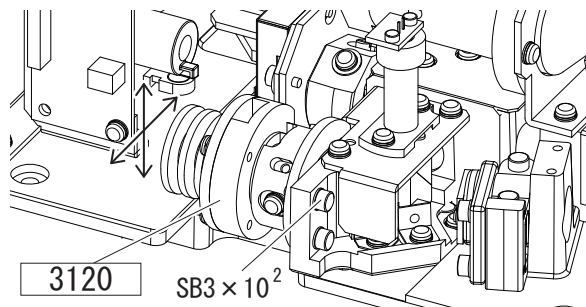
- 6) Press the CCD button  to display the center of the green cross (A) on the screen and reticle cross (B) of the pachy phototransmitter adjustment jig (18570-2100).

- 7) Using the NT-5P optical adjustment jig (18570-2300), align the reticle cross (B) of the pachy phototransmitter adjustment jig (18570-2100) to the center of the green cross (A) on the screen.

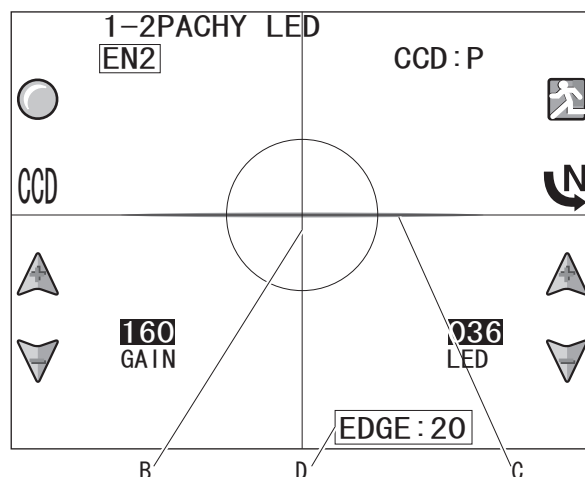


- 4 . Following the procedure below, adjust the position of the slit (C) so that both ends of the slit appear sharply.

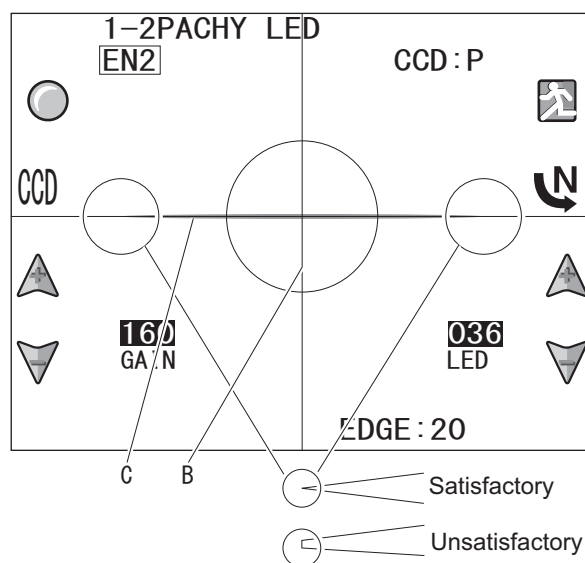
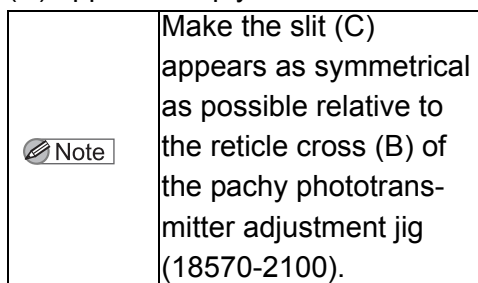
- 1) Loosen SB3 × 10 (n = 2).



- 2) Adjust the vertical position of the pachy illumination ASSY (18538-3120) so that the slit (C) is aligned to the horizontal line (B) of the reticle cross for the pachy phototransmitter adjustment jig (18570-2100).

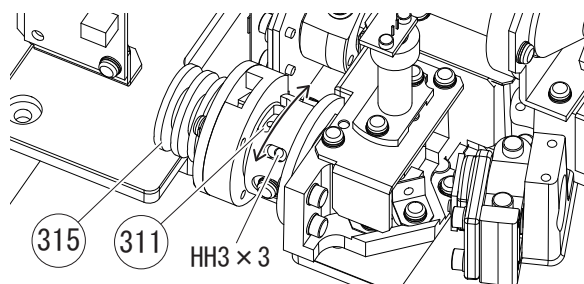


- 3) Adjust the horizontal position of the pachy illumination ASSY (18538-3120) so that both ends of the slit (C) appear sharply.

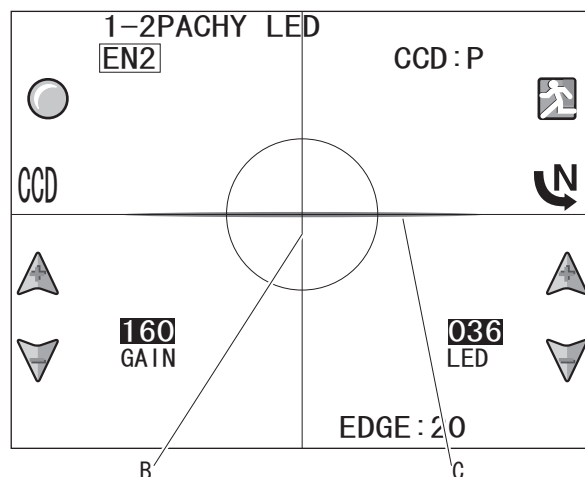


- 4) Confirm that the horizontal line (B) of the reticle cross for the pachy phototransmitter adjustment jig (18570-2100) and slit (C) are parallel.
- 5) If they are not, perform adjustment by the following procedure.

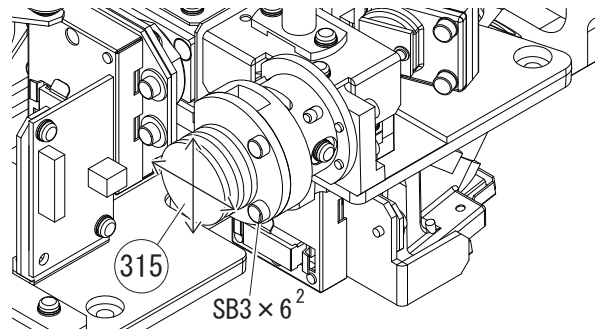
- a . Loosen HH3 × 3.
- b . Turn the lens holder (18538-M311) and precisely adjust it so that the horizontal line (B) of the reticle cross for the pachy phototransmitter adjustment jig (18570-2100) and slit (C) are parallel.
- c . After the adjustment is complete, tighten HH3 × 3 securely.




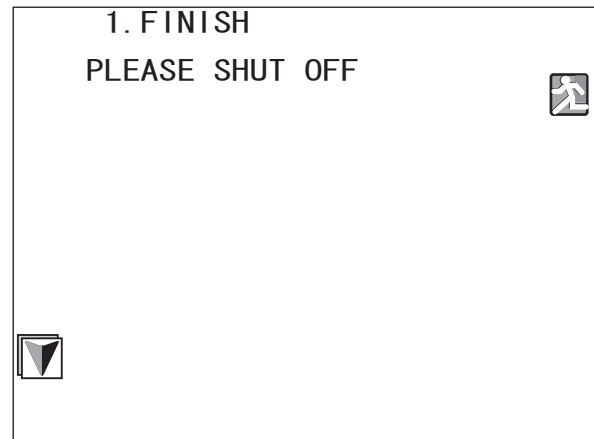
- 6) Confirm that the slit (C) is focused and aligned.



- 5 . Loosen SB3 × 6 (n = 2) to adjust the position of the heat sink (18538-M315) so that the brightness of the slit is uniform and maximum.



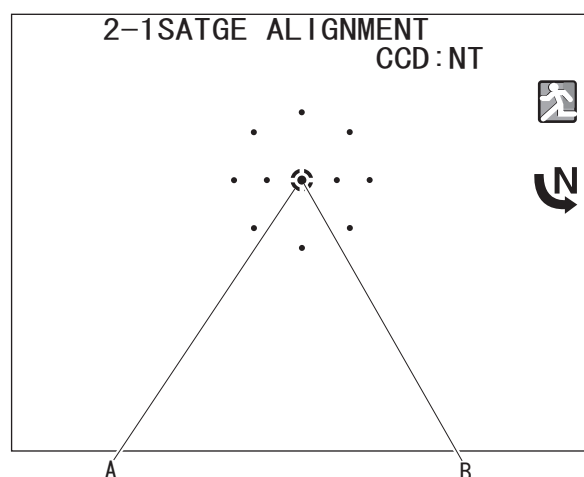
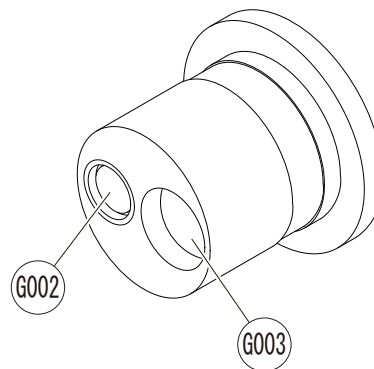
- 6 . After the adjustment is complete, press the next button  to display the 1. FINISH screen, then turn off power to the device.
- 7 . Remove the jigs.
- 8 . Connect the cable of the pachy photodetector ASSY (18538-3200) to P107 (J7) on the main board (18538-BA01P).
- 9 . Reassemble the parts in the reverse order.



8.4.2 Pachy photodetector ASSY

8.4.2.1 STAGE ALIGNMENT

- 1 . Attach the following jigs.
 - 1) NT-5P optical adjustment jig (18570-2300) (See 8.2.7.1 [p133].)
 - 2) Pachy adjustment model eye holder (18570-2600) (See 8.2.7.4 [p134].)
- 2 . Enter pachy adjustment mode to select "12. CAMERA POSITION" (see 8.1.2 [p120]).
- 3 . Using the NT-5P optical adjustment jig (18570-2300), align the spherical model eye (model eye -5 D/R8.0 [32177-G003]) of the pachy adjustment model eye holder (18570-2600) and align the centers of the electronic reticle (A) and alignment spot (B).



- 4 . Press the next button  to perform the following.



Note

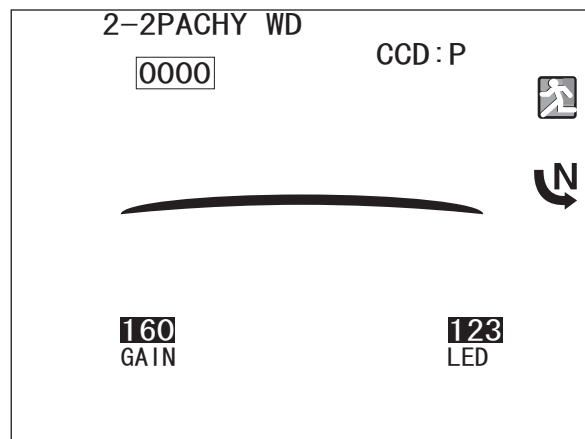
Pressing the next button  displays the 2-2PACHY WD screen

- 1) PACHY WD (See 8.4.2.2 [p164].)

8.4.2.2 PACHY WD

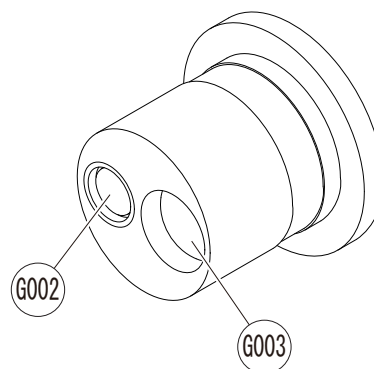
- 1 . Cover the adjusted NT measuring ASSY (18538-9100) with a black cloth or such to shade it from interference light.
- 2 . Adjust the Z axis stage of the NT-5P optical adjustment jig (18570-2300) so that the four-digit value at the upper left of the screen is "0000".

	<p>Caution</p> <p>Do not move the X and Y axis stages of the NT-5P optical adjustment jig (18570-2300). If the X and Y axis stages are moved, perform the following. STAGE ALIGNMENT (See 8.4.2.1 [p163].)</p>
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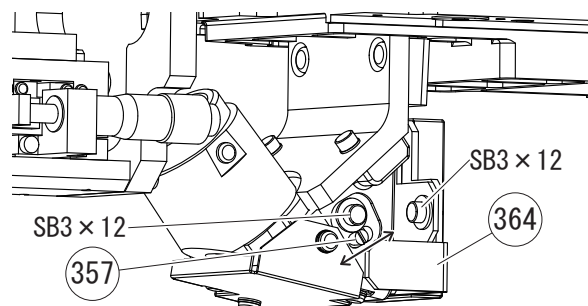
- 3 . Move the X axis stage of the NT-5P optical adjustment jig (18570-2300) to change the spherical model eye of the pachy adjustment model eye holder (18570-2600) to the flat model eye.

- 1) Spherical model eye: Model eye -5 D/R8.0 (32177-G003)
- 2) Flat model eye: Window (18570-G002)



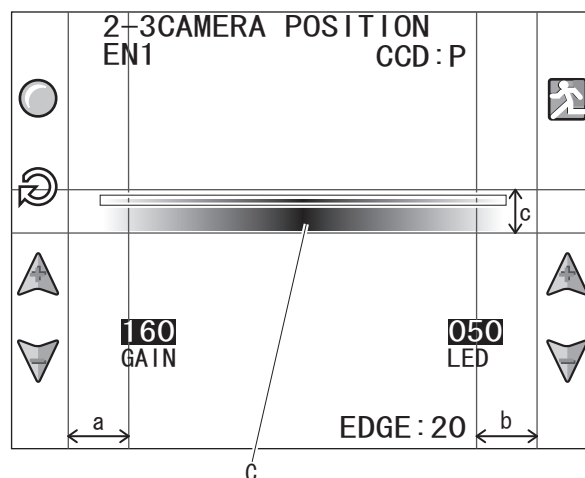
- 4 . Adjust the focus of the slit by the following procedure.

- 1) Loosen SB3 × 12.
- 2) Move SB3 × 12 along the key (31401-M357) to adjust the focus of the slit (C).






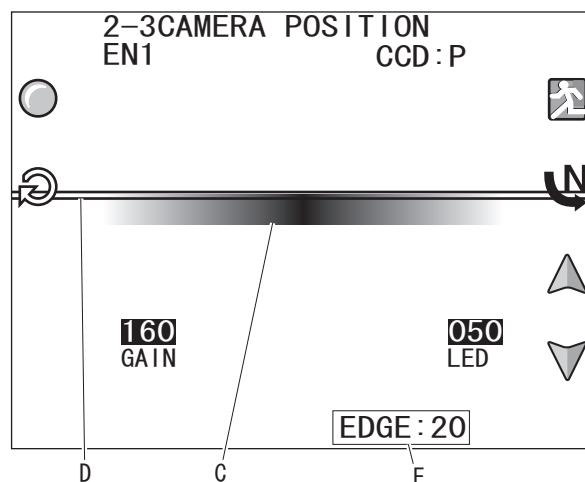
- 5 . Adjust the position of the slit by the following procedure.

- 1) Loosen SB3 × 12 (n = 2).
- 2) Adjust the CCD spacer (18538-M364) by the following procedure.
 - a . Adjust the horizontal position of the spacer so that the left end of the slit (C) appears in the a area and the right end appears in the b area.
 - b . Adjust the vertical position of the spacer so that the upper part (surface of the flat model eye) of the slit (C) appears in the c area.
 - c . Adjust the spacer so that the slit (C) and the c area are parallel.



3) Check the inclination of the slit (C) by the following procedure.

- a . Press the reset button  to display the horizontal line (D) for inclination check.
- b . Adjust the position of the horizontal line (D) for inclination check with the up button  or down button .
- c . Confirm that the slit (C) and horizontal line (D) for inclination check are parallel.




 Note

Be sure that the surface of the flat model eye appears within the range of the horizontal line.
The EDGE value indicated in the E area should be maximum and "LED OVER" must not be displayed.

4) Repeat Step 3) until the slit (C) and horizontal line (D) for inclination check are parallel.

6 . Press the next button  to perform the following.

 Note

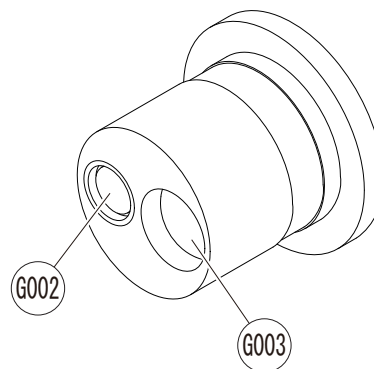
Pressing the next button  displays the 2-4PACHY IMAGE POSITION screen

1) PACHY IMAGE POSITION ([See 8.4.2.3 \[p166\].](#)).

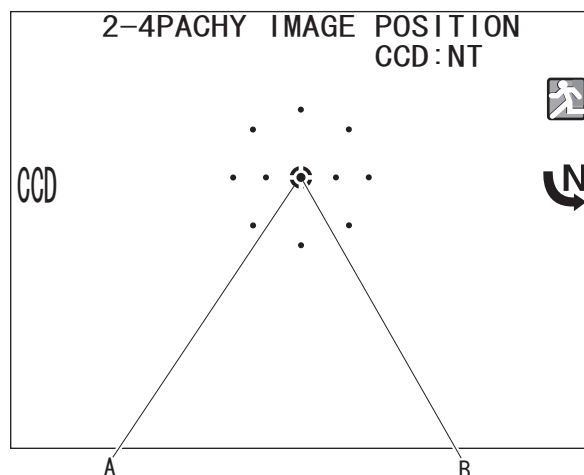
8.4.2.3 PACHY IMAGE POSITION



- 1 . Move the X axis stage of the NT-5P optical adjustment jig (18570-2300) to change the flat model eye of the pachy adjustment model eye holder (18570-2600) to the spherical model eye.

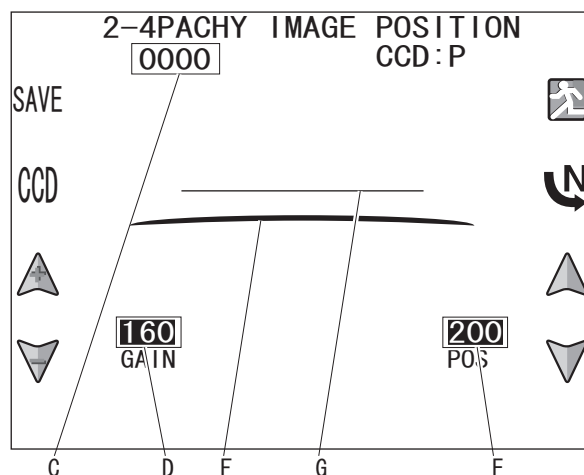
- 1) Spherical model eye: Model eye -5 D/R8.0 (32177-G003)
- 2) Flat model eye: Window (18570-G002)





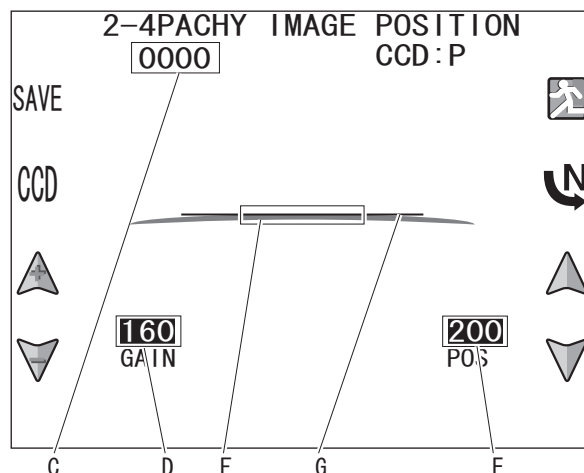
- 2 . Move the X axis stage of the NT-5P optical adjustment jig (18570-2300) to align the electronic reticle (A) to the alignment spot (B).




- 3 . Press the CCD button to switch the screen.
- 4 . Adjust the Z axis stage of the NT-5P optical adjustment jig (18570-2300) so that the distance (C) is 0.
- 5 . Adjust the intensity (D) with the up+ button  or down- button  so that the slit (F) can be seen clearly.

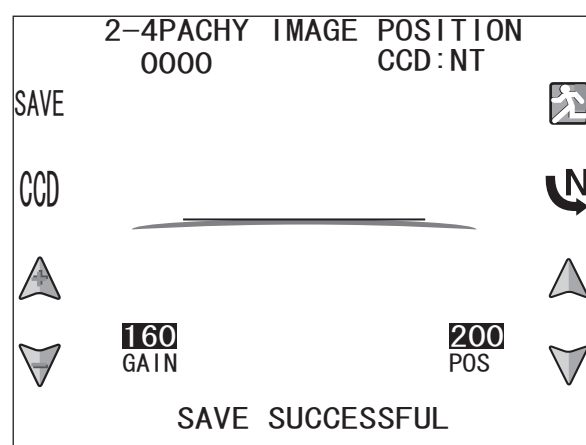


- 6 . Adjust the position of the horizontal line (G) with the up button  or down button  so that the horizontal line (G) is aligned to the upper part of the slit (F).



- 7 . Pressing the SAVE button displays “SAVE SUCCESSFUL” at the bottom of the screen, then the screen automatically changes to the 2. FINISH screen.

 Note	The set value is saved.
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- 8 . After the screen changes to the 2. FINISH screen, turn off the power.
- 9 . Remove the jigs.
- 10 . Reassemble the parts in the reverse order.
- 11 . Perform the following.
- 1) Pachy calibration ([See 8.4.3 \[p168\].](#))



8.4.3 Pachy calibration



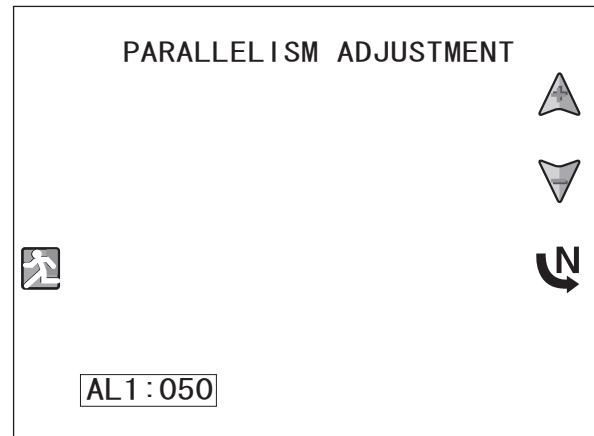
Caution

Perform pachy calibration in a darkened room.

When not in use, keep the pachy calibration jig in a storage case (18541-1050).

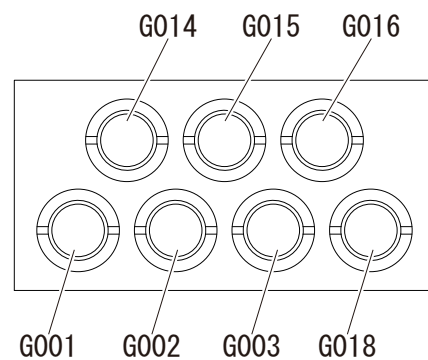
8.4.3.1 PARALLELISM ADJUSTMENT



- 1 . Attach the following jigs.
 - 1) Chinrest attachment jig (32107-1100) (See 8.2.4 [p128].)
 - 1) Pachy calibration jig (18570-2500) (See 8.2.7.3 [p134].)
- 2 . Enter pachy calibration mode to select "1. PARALLELISM ADJ" (see 8.1.3 [p121]).

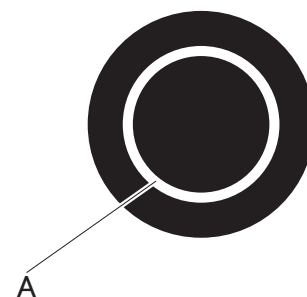


- 3 . Adjust the pachy calibration jig (18570-2500) by the following procedure.

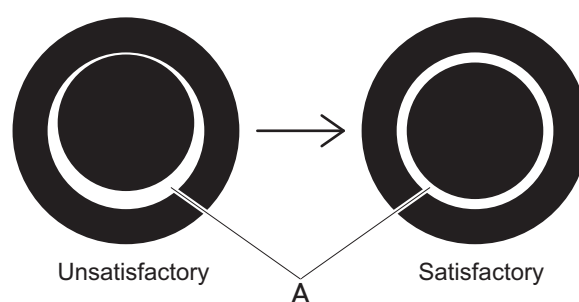
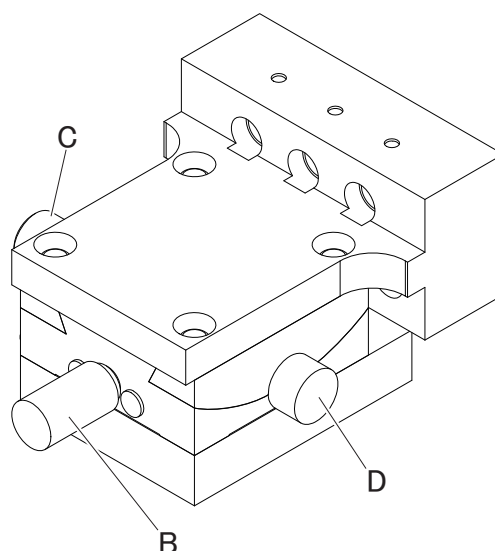
- 1) Align G002 of the pachy calibration jig (18570-2500).



- 2) If the A area is not seen clearly, adjust it using the up+ button  or down- button .




- 3) Make the width of the A area for the pachy calibration jig (18570-2500) uniform by the following procedure.
- Turn knob B to adjust the vertical position.
 - Loosen knob C to adjust the horizontal position.
 - Fasten knob B with knob D.



- 4 . Press the next button  to perform the following.






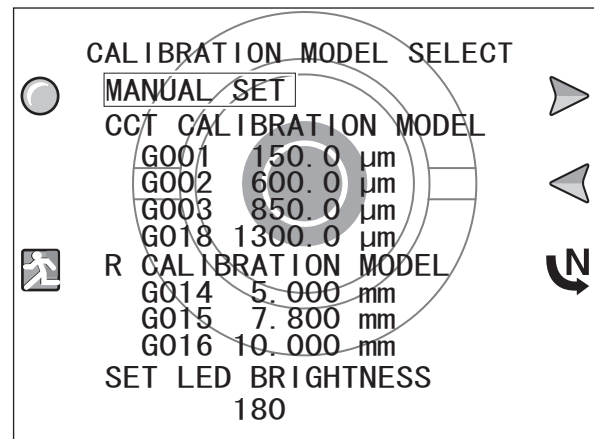
Pressing the next button  displays the CALIBRATION MODEL SELECT screen.





- 1) CALIBRATION MODEL SELECT ([See 8.4.3.2 \[p170\].](#))


8.4.3.2 CALIBRATION MODEL SELECT

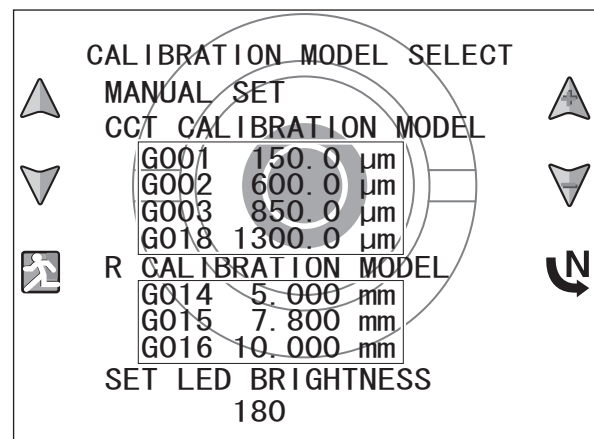
- 1 . Enter the model eye numeric value indicated on the sticker on the pachy calibration jig (18570-2500) and the SET LED BRIGHTNESS value by the following procedure.


- 1) Press the right button  or left button  to change "18570-2500 No. 1" to "MANUAL SET".
- 2) Press the execute button .

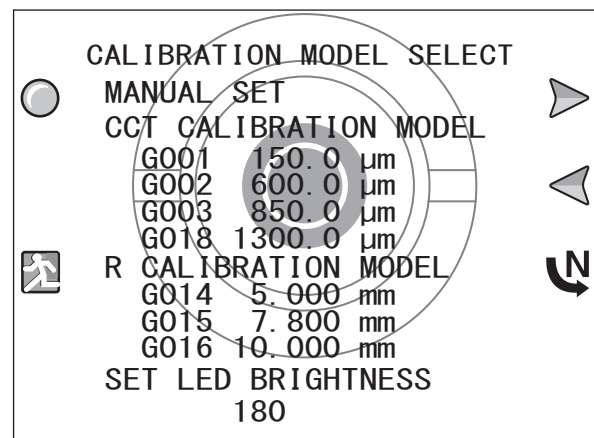



- 3) Select the desired model eye with the up button  or down button .
- 4) Press the up+ button  or down- button  to change each numeric value.



 Note	The numeric value can also be changed with the joystick.
--	--



- 2 . After entering the numeric values, press the exit button .



- 3 . Press the next button  to perform the following.


 Note	Pressing the next button  displays the LED & MEAS AREA ADJ screen.
--	---

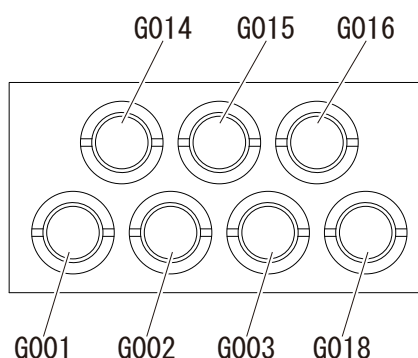
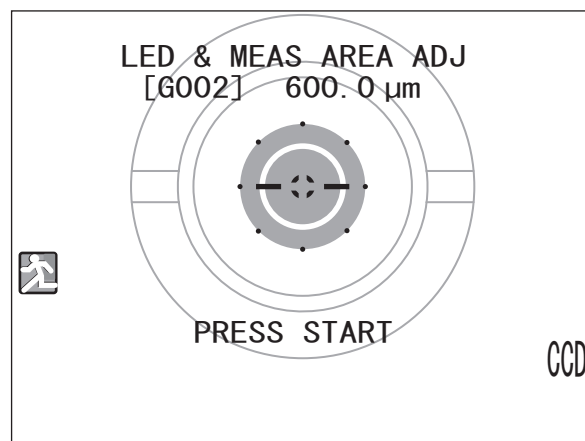
- 1) LED & MEAS AREA ADJ ([See 8.4.3.3 \[p171\].](#))

8.4.3.3 LED & MEAS AREA ADJ

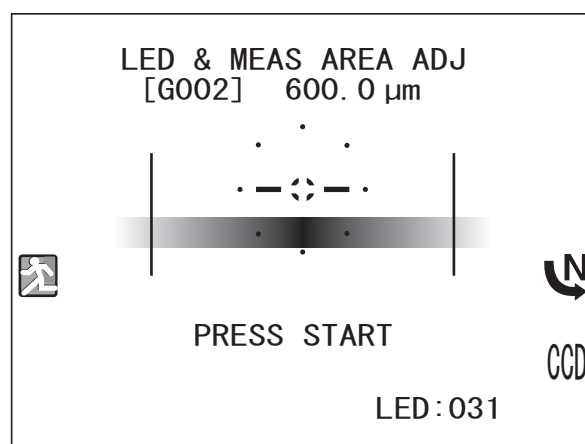
1 . Calibrate the LED intensity and measurement range by the following procedure.

- 1) Align G002 of the pachy calibration jig (18570-2500).


 Note	Confirm that the electronic reticle becomes yellow.
--	---





- 2) Press the CCD button and confirm that there is no dust on the G002 image of the calibration jig 18570-2500).
- 3) Press the start button to display the calibration screen that indicates the LED intensity and measurement range.
- 4) Press the start button to perform calibration.

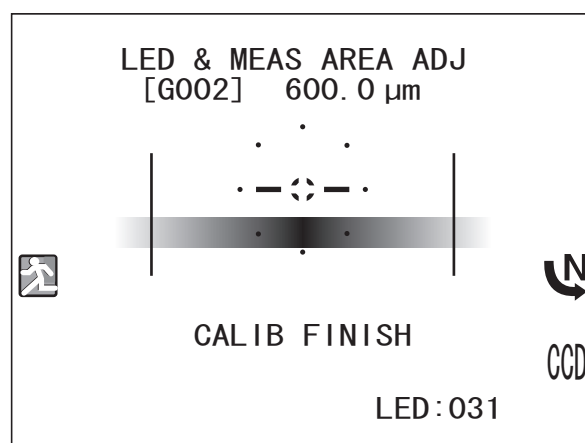


- 5) When the calibration is complete, "CALIB FINISH" is displayed.

2 . Press the next button  to perform the following.

 Note	Pressing the next button  displays the CCT CALIBRATION screen.
--	---

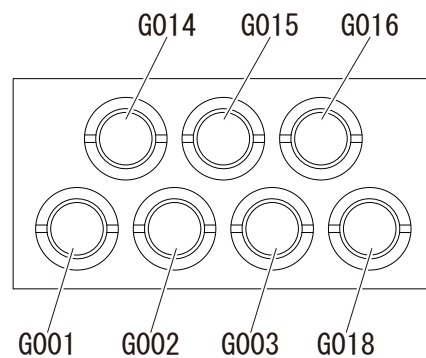
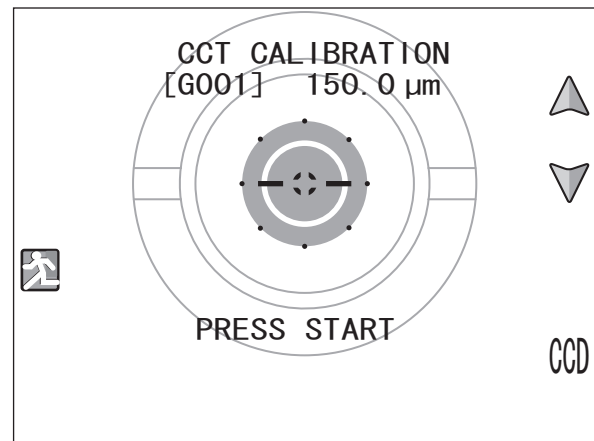
- 1) CCT CALIBRATION (See 8.4.3.4 [p172].)



8.4.3.4 CCT CALIBRATION

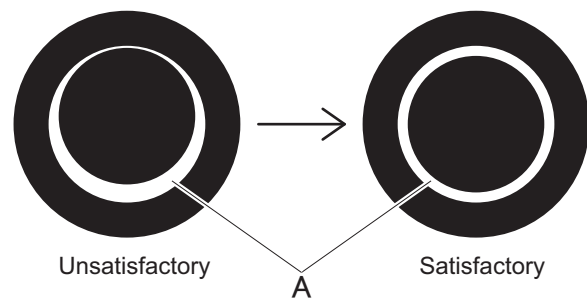
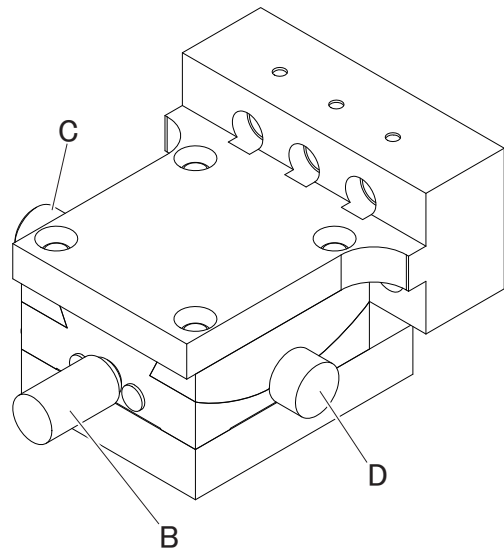
1 . Calibrate G001 of the pachy calibration jig (18570-2500) by the following procedure.

- 1) Align G001 of the pachy calibration jig (18570-2500).



- 2) Make the width of the A area for the pachy calibration jig (18570-2500) uniform by the following procedure.

- a . Turn knob B to adjust the vertical position.
- b . Loosen knob C to adjust the horizontal position.
- c . Fasten knob B with knob D.



3) Align G001 of the pachy calibration jig (18570-2500) again.



Confirm that the electronic reticle becomes yellow.

4) Press the start button to perform calibration.

5) When the following are displayed, the G001 calibration is complete.

- a . The name and numeric value of the model eye to be calibrated next are displayed.



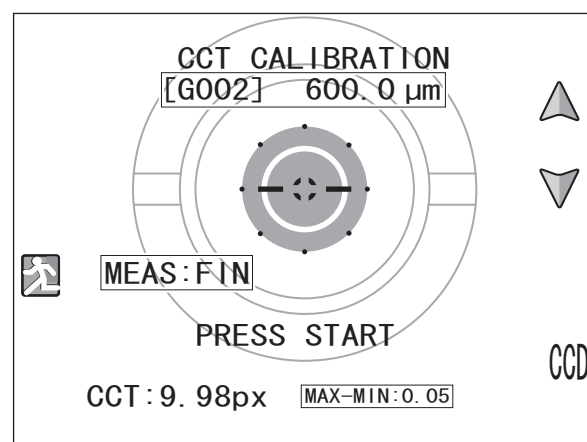
"[G002] 600.0μm"
(entered numeric value)

- b . "MEAS: FIN" is displayed.

6) Confirm that the value of "MAX-MIN" is 0.18 or less.



If the value exceeds the above one, it appears in red.



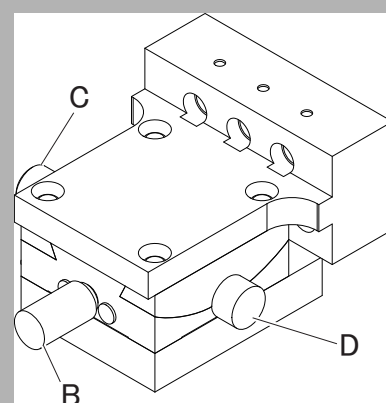
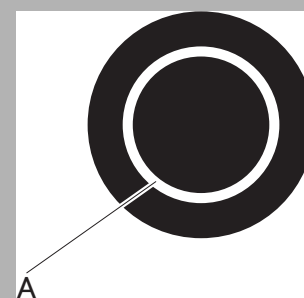
7) If the MAX-MIN value appears in red, press the CCD button and confirm that there is no dust on the model eye image of the pachy calibration jig (18570-2500). Press the start button again to perform calibration.



2 . Calibrate G002, G003, and G018 of the pachy calibration jig (18570-2500) in the same procedure as G001.

⚠ Caution

Adjust the inclination of the pachy calibration jig (18570-2500) using the following knobs so that the width of the jig A area is uniform for each model eye.


- 1 . Knob B
- 2 . Knob C

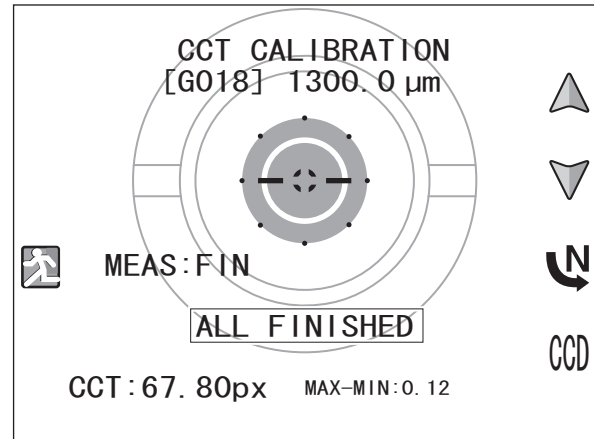


Pressing the up button  or down button  can change the model eye to be calibrated.

1) Confirm that the value of “MAX-MIN” is as follows:


- a . For G002: 0.20 or less
- b . For G003: 0.20 or less
- c . For G018: 0.25 or less

2) When the calibrations of G001, G002, G003, and G018 are complete, “ALL FINISHED” and the next button  are displayed on the screen.



3 . Press the next button  to perform the following.




Pressing the next button  displays the CCT CALIBRATION CHECK screen.

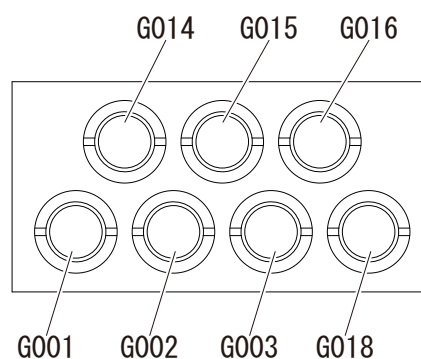
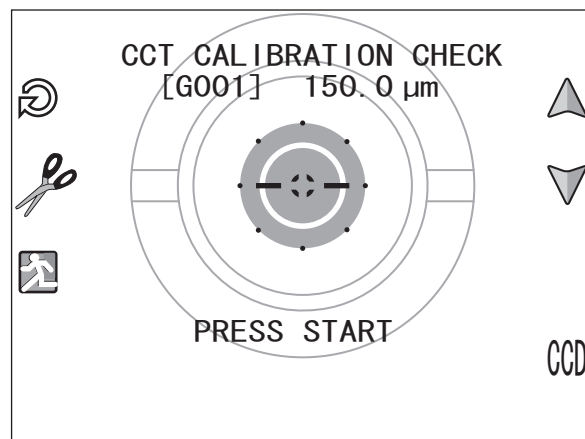
1) CCT CALIBRATION CHECK ([See 8.4.3.5 \[p175\].](#))

8.4.3.5 CCT CALIBRATION CHECK

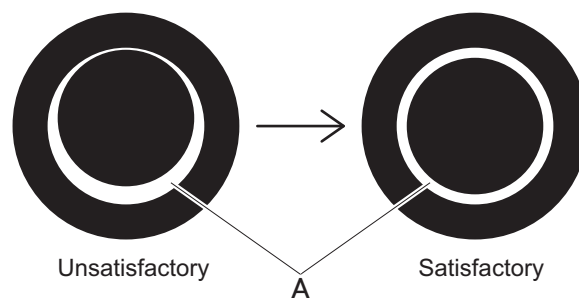
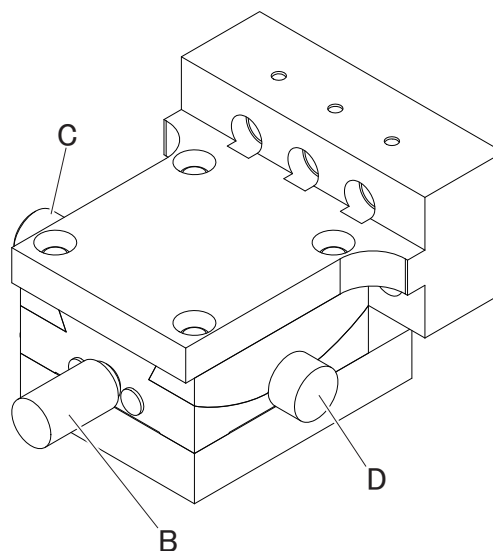
- 1 . Check the calibration of G001 of the pachy calibration jig (18570-2500) by the following procedure.

- 1) Align G001 of the pachy calibration jig (18570-2500).

 Note	Confirm that the electronic reticle becomes yellow.
--	---



- 2) Make the width of the A area for the pachy calibration jig (18570-2500) uniform by the following procedure.
 - a . Turn knob B to adjust the vertical position.
 - b . Loosen knob C to adjust the horizontal position.
 - c . Fasten knob B with knob D.



- 3) Align G001 of the pachy calibration jig (18570-2500) again.



Confirm that the electronic reticle becomes yellow.

- 4) Press the start button to check the calibration.

- 5) When the following are displayed, the G001 calibration check is complete.

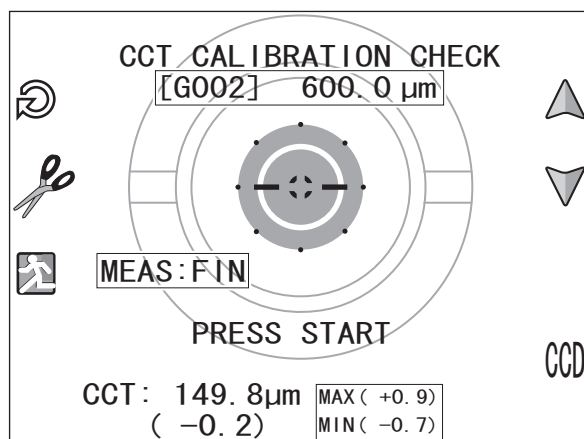
- a . The name and numeric value of the model eye of that calibration to be checked next are displayed.

	"[G002] 600.0 μ m" (entered numeric value)
--	---

- b . "MEAS: FIN" is displayed.

- 6) Confirm that the values of "MAX" and "MIN" for G001 are as follows:

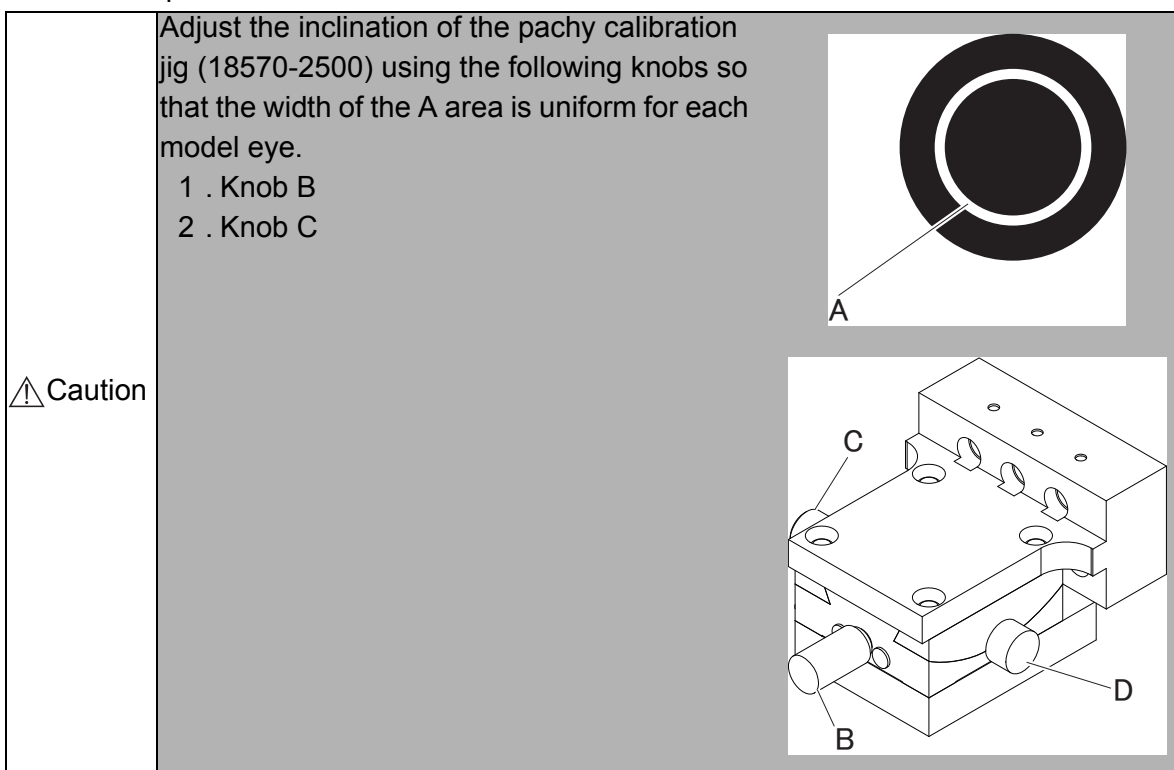
- a . MAX: +5 or less
b . MIN: -5 or less



If the values exceed the above ones, they appear in red.

- 7) If the MAX and MIN values appear in red, press the CCD button and confirm that there is no dust on the model eye image of the pachy calibration jig (18570-2500).
Press the start button again to check the calibration.

- 2 . Check the calibrations of G002, G003, and G018 of the pachy calibration jig (18570-2500) in the same procedure as G001.




Pressing the up button or down button can change the model eye of that calibration to be checked.

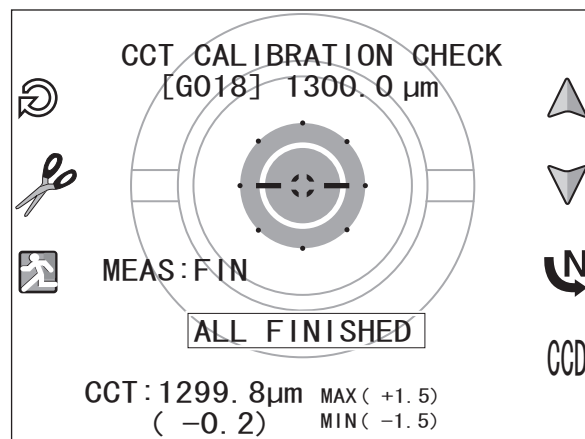
1) Confirm that the values of “MAX” and “MIN” for each model eye are as follows:

a . MAX: +5 or less

b . MIN: -5 or less

2) When the calibration checks of G002, G003, and G018 are complete, “ALL FINISHED” and the next

button  are displayed on the screen.



3 . Press the next button  to perform the following.




Pressing the next button  displays the R CALIBRATION screen.

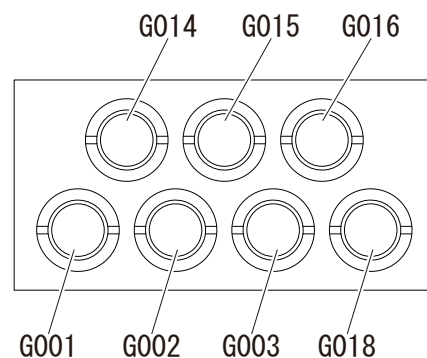
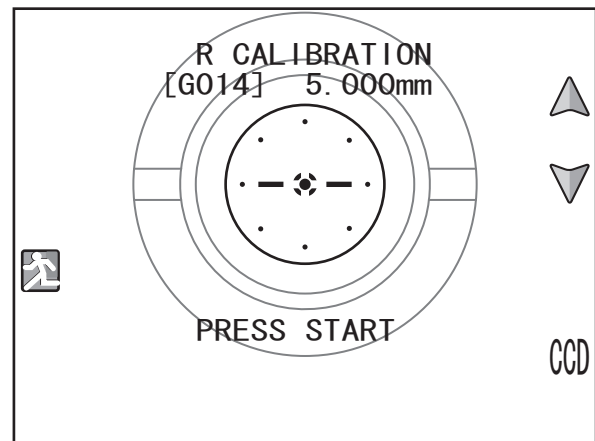
1) R CALIBRATION ([See 8.4.3.6 \[p178\].](#))

8.4.3.6 R CALIBRATION

1 . Calibrate G014 of the pachy calibration jig (18570-2500) by the following procedure.

- 1) Align G014 of the pachy calibration jig (18570-2500).


 Note	Confirm that the electronic reticle becomes yellow.
--	---



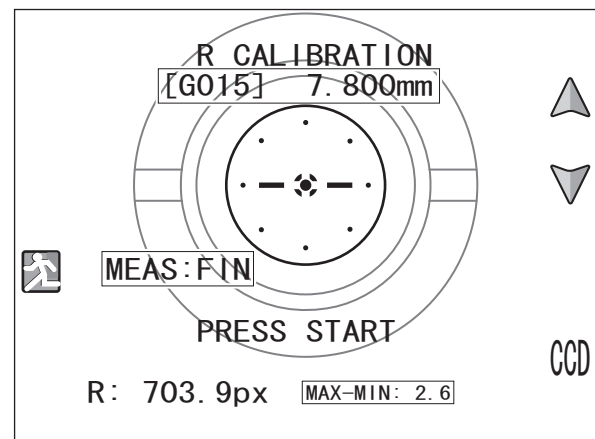
2) Press the start button to perform calibration.

3) When the following are displayed, the G014 calibration is complete.


- a . The name and numeric value of the model eye to be calibrated next are displayed.

 Note	"[G015] 7.800mm" (entered value)
--	-------------------------------------

- b . "MEAS: FIN" is displayed.





4) Confirm that the value of "MAX-MIN" is 5 or less.

 Note	If the value exceeds the above one, it appears in red.
--	--

5) If the MAX-MIN value appears in red, press the CCD button and confirm that there is no dust on the model eye image of the pachy calibration jig (18570-2500). Press the start button again to perform calibration.

- 2 . Calibrate G015 and G016 of the pachy calibration jig (18570-2500) in the same procedure as G014.




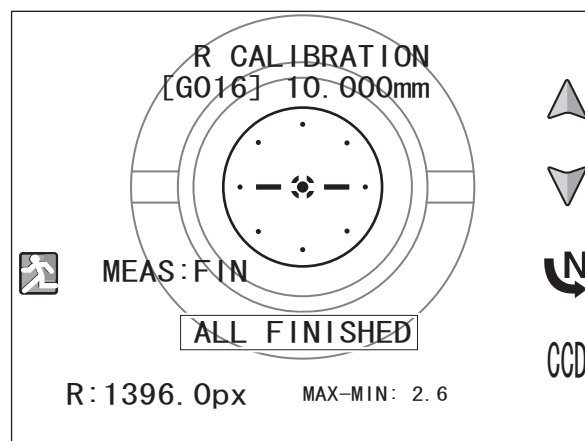
Pressing the up button  or down button  can change the model eye of that calibration to be checked.

- 1) Confirm that the value of "MAX-MIN" is as follows:

a . For G015: 10 or less


b . For G016: 17 or less

- 2) When the calibrations of G014 and G016 are complete, "ALL FINISHED" and the next button  are displayed on the screen.



- 3 . Press the next button  to perform the following.




Pressing the next button  displays the R CALIBRATION CHECK screen.

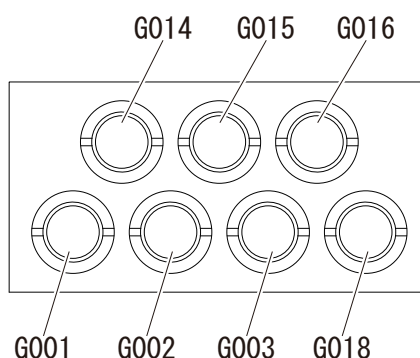
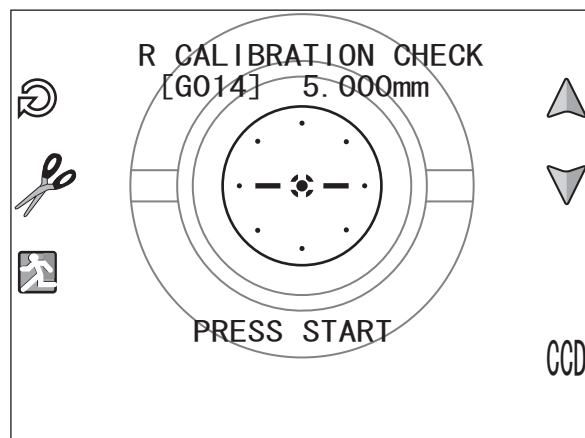
- 1) R CALIBRATION CHECK ([See 8.4.3.7 \[p180\].](#))

8.4.3.7 R CALIBRATION CHECK

- 1 . Check the calibration of G014 of the pachy calibration jig (18570-2500) by the following procedure.


- 1) Align G014 of the pachy calibration jig (18570-2500).

 Note	Confirm that the electronic reticle becomes yellow.
--	---

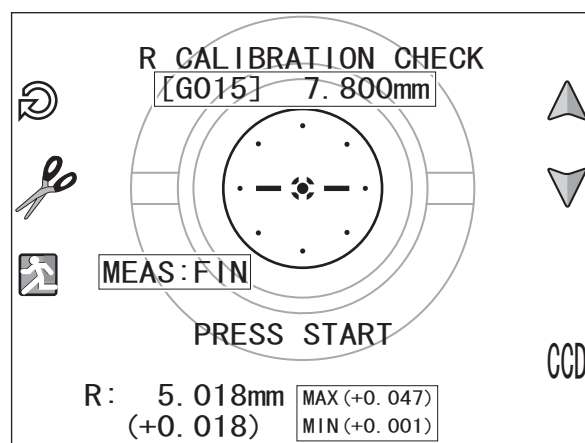


- 2) Press the start button to check the calibration.
- 3) When the following are displayed, the G014 calibration check is complete.

- a . The name and numeric value of the model eye of that calibration to be checked next are displayed.


 Note	[G015] 7.800mm (entered value)
--	-----------------------------------

- b . “MEAS: FIN”






- 4) Confirm that the values of “MAX” and “MIN” for G014 are as follows:

- a . MAX: within +0.15 mm
- b . MIN: within -0.15 mm

 Note	If the values exceed the above ones, they appear in red.
--	--

- 5) If the MAX and MIN values appear in red, press the CCD button and confirm that there is no dust on the model eye image of the pachy calibration jig (18570-2500). Press the start button again to check the calibration.

- 2 . Check the calibrations of G015 and G016 of the pachy calibration jig (18570-2500) in the same procedure as G014.

 Note	Pressing the up button  or down button  can change the model eye of that calibration to be checked.
--	--

- 1) Confirm that the values of “MAX” and “MIN” for each model eye are as follows:

a . For G015:

MAX: within +0.30mm


MIN: within -0.30mm

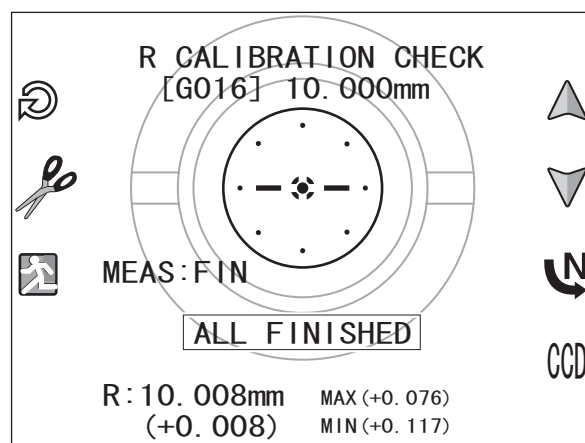
b . For G016:

MAX: within +0.55 mm

MIN: within -0.55 mm

- 2) When the calibrations of G014 and G016 are complete, “ALL FIN-

ISHED” and the next button  are displayed on the screen.



- 3 . Press the next button  to perform the following.

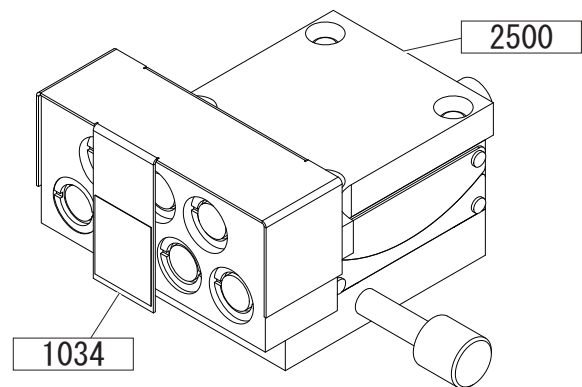
 Note	Pressing the next button  displays the LED ADJUSTMENT (CORNEA) screen.
--	---

- 1) LED ADJUSTMENT (CORNEA) ([See 8.4.3.8 \[p182\].](#))

8.4.3.8 LED ADJUSTMENT (CORNEA)

1 . Attach the following jig to the pachy calibration jig (18570-2500)

1) Filter jig (18541-1034) (See 8.2.7.5 [p134].).

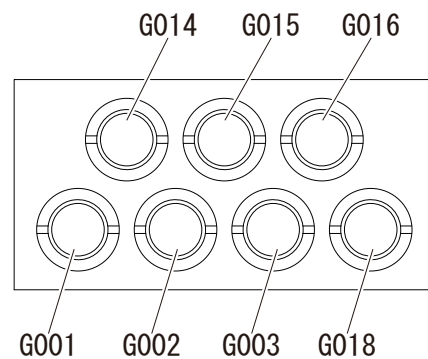
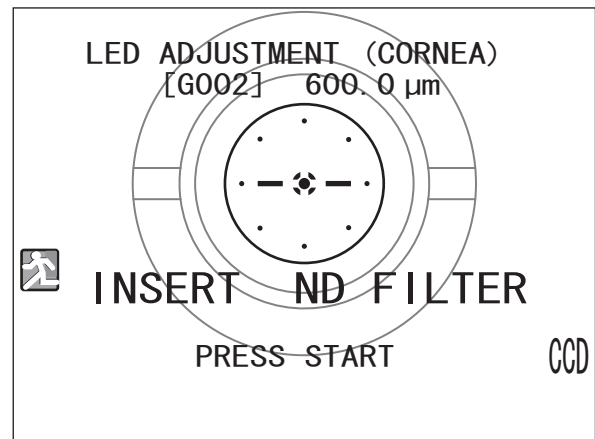


2 . Press the start button.

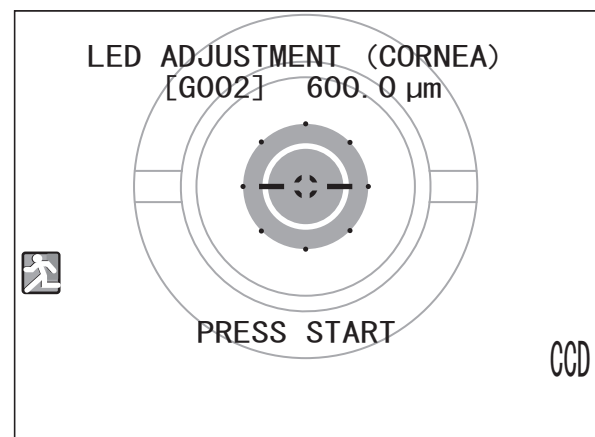



"INSERT ND FILTER" disappears.

3 . Align G002 of the pachy calibration jig (18570-2500).





4 . Press the start button to calibrate the LED intensity.



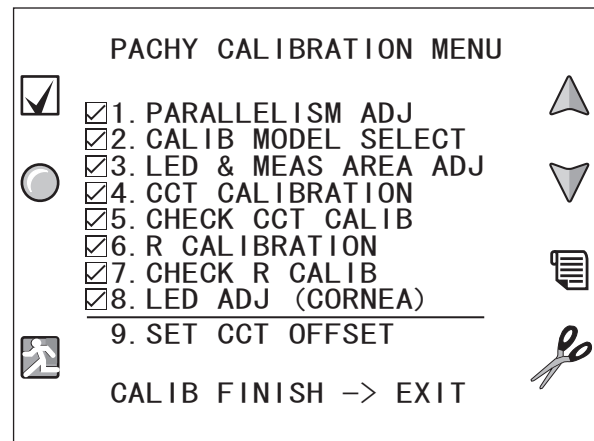
- 5 . When the calibration is complete, “CALIB FINISH” and the next button  are displayed on the screen.



- 6 . Press the next button  to display the PACHY CALIBRATION MENU screen.

 Note	Each item checkbox is ticked and “CALIB FINISH -> EXIT” is displayed.
--	---

- 7 . After the calibration is complete, keep the pachy calibration jig in a storage case (18541-1050) when not in use.




- 8 . Perform the following.

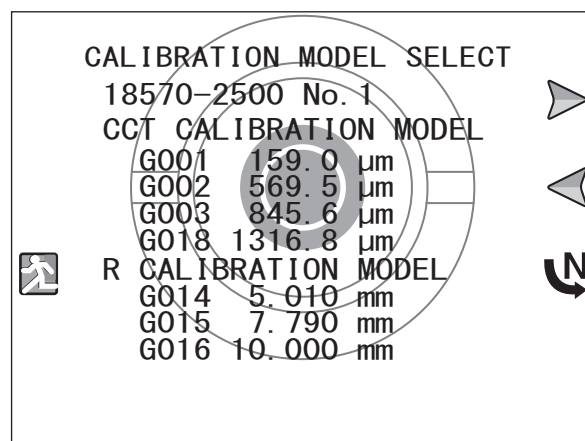
- 1) EEPROM Backup ([See 8.8 \[p198\].](#))



8.4.4 Pachy inspection

<p>⚠ Caution</p>	<p>Perform pachy inspection in a darkened room.</p> <p>If inspection cannot be performed in a darkened room, cover the pachy calibration jig (18570-2500) and device with a black cloth or such to shade them from interference light.</p> <p>When not in use, keep the pachy calibration jig in a storage case (18541-1050).</p>
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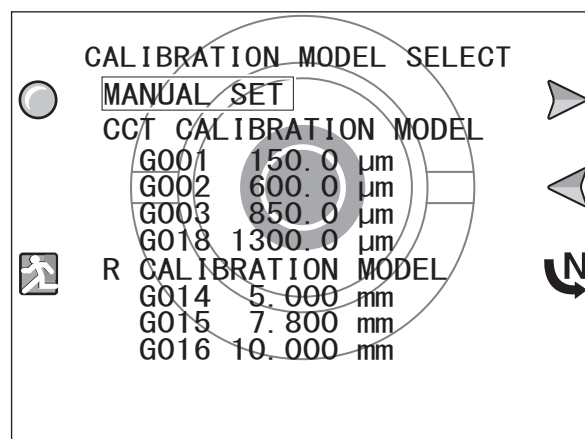
- 1 . Attach the following jigs.
 - 1) Chinrest attachment jig (32107-1100) (See 8.2.4 [p128].)
 - 2) Pachy calibration jig (18570-2500) (See 8.2.7.3 [p134].)
- 2 . Enter pachy inspection mode (see 8.1.5.2 [p124]).
- 3 . Enter the model eye numeric value indicated on the sticker on the pachy calibration jig (18570-2500) by the following procedure.



- 1) Press the OK button  to display the CALIBRATION MODEL SELECT screen.





- 2) Press the right button  or left button  to change "18570-2500 No. 1" to "MANUAL SET".

- 3) Press the execute button .

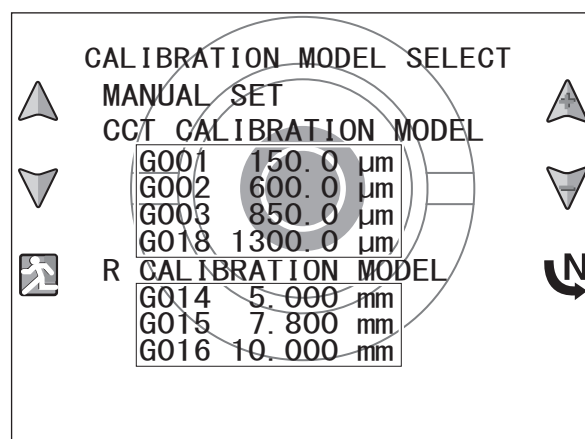



- 4) Select the desired model eye with the up button  or down button .

- 5) Press the up+ button  or down- button  to change each numeric value.



The value can also be changed with the joy-stick.




- 6) After entering the numeric values, press the exit button .

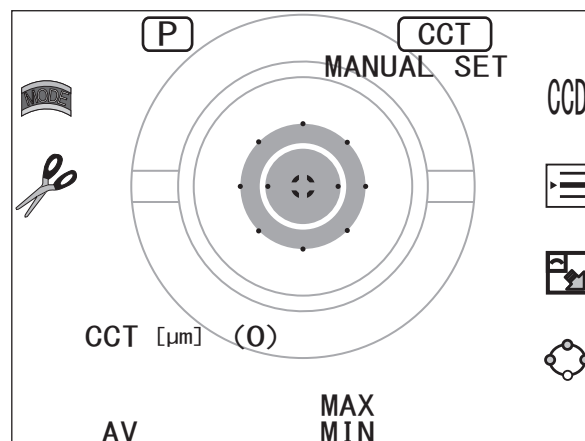
- 4 . Position the pachy calibration jig (18570-2500) and device so they are not exposed to any interference light.

⚠ Caution

Perform pachy inspection in a darkened room.

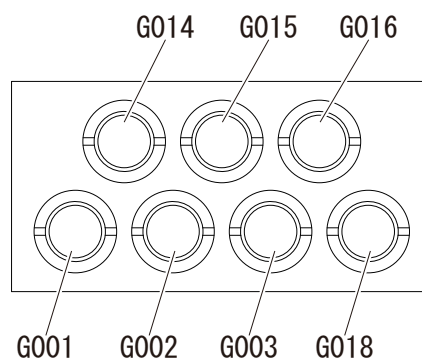
If inspection cannot be performed in a darkened room, cover the pachy calibration jig (18570-2500) and device with a black cloth or such to shade them from interference light.

- 5 . Press the mode change button  to display "CCT".



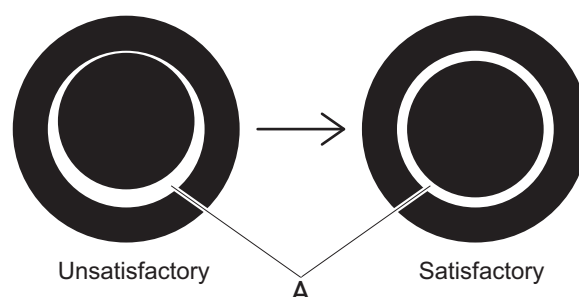
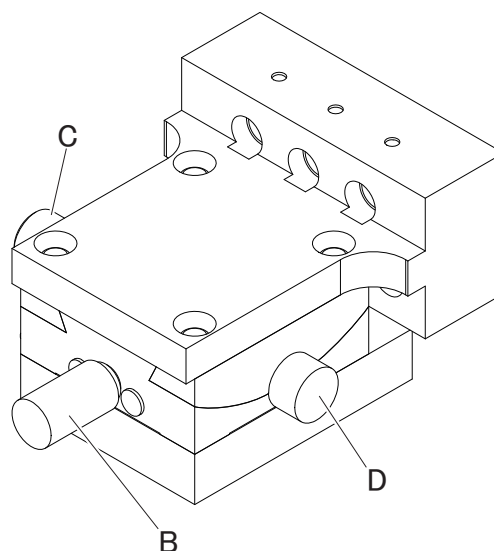
- 6 . Measure the Center Corneal Thickness (CCT) of G001 for the pachy calibration jig (18570-2500) by the following procedure.

- 1) Align G001 of the pachy calibration jig (18570-2500).

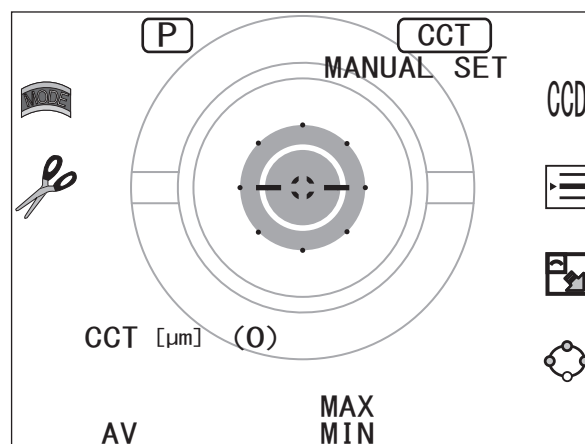


- 2) Make the width of the A area for the pachy calibration jig (18570-2500) uniform by the following procedure.

- a . Turn knob B to adjust the vertical position.
- b . Loosen knob C to adjust the horizontal position.
- c . Fasten knob B with knob D.

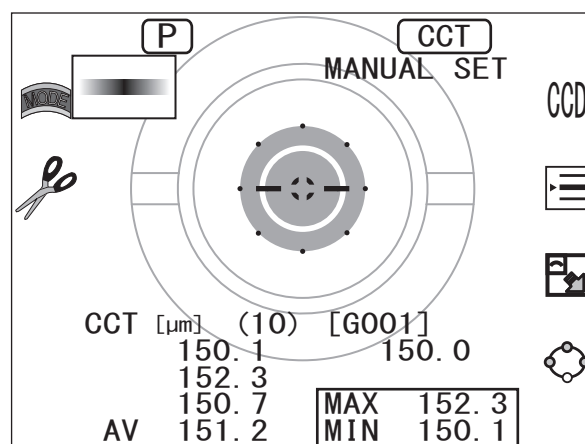


- 3) Align G001 of the pachy calibration jig (18570-2500) so that the electronic reticle becomes yellow.



- 4) Press the start button to measure the Center Corneal Thickness (CCT) of G001.
- 5) Confirm that the measurement MAX and MIN values are within the range of the entered numeric value $\pm 4 \mu\text{m}$ for the model eye.

Note	<p>If the MAX and MIN values are outside the range of the entered numeric value $\pm 4 \mu\text{m}$ for the model eye, they appear in red.</p>
------	---




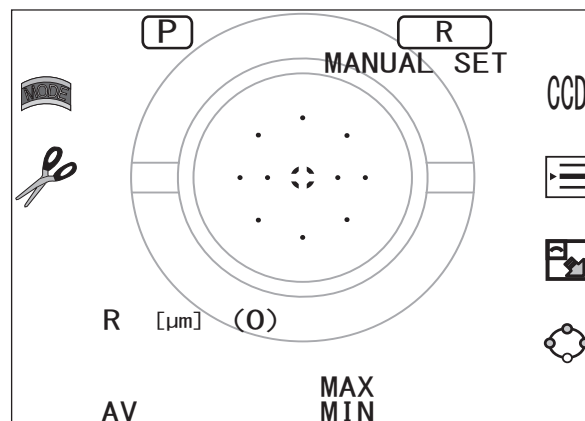
- 6) If the MAX and MIN values appear in red, press the CCD button and confirm that there is no dust on the model eye image of the pachy calibration jig (18570-2500). Press the start button again to perform measurement.
- 7 . Measure G002, G003, and G018 of the pachy calibration jig (18570-2500) in the same procedure as G001.

Caution

Adjust the inclination of the pachy calibration jig (18570-2500) using the following knobs so that the width of the A area is uniform for each model eye.

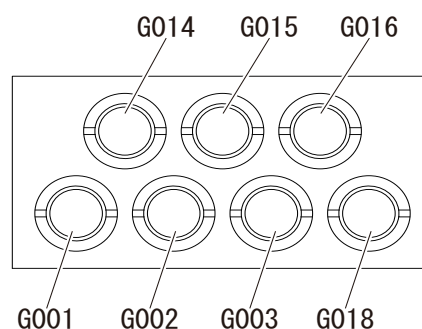
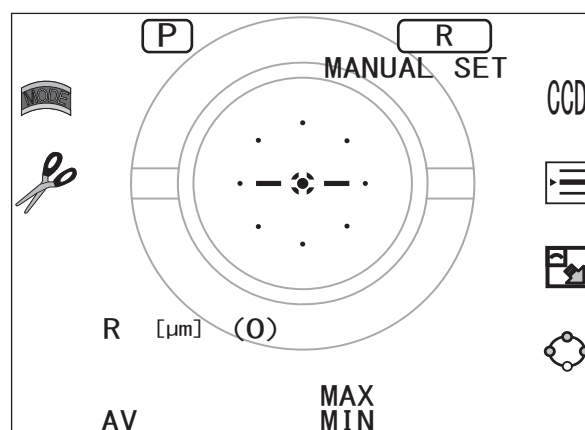
- 1 . Knob B
- 2 . Knob C

- 8 . Confirm that the measurement MAX and MIN values of each model eye are within the range of the entered numeric value $\pm 4 \mu\text{m}$ for the model eye.
- 9 . Press the mode change button  to display "R".




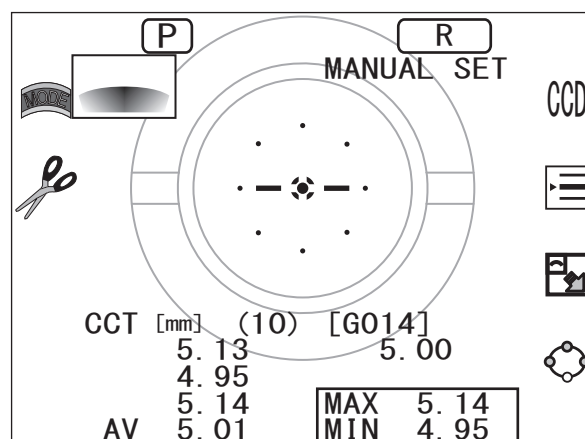
10. Measure the corneal curvature radius (R) of G014 for the pachy calibration jig (18570-2500) by the following procedure.

- 1) Align G001 of the pachy calibration jig (18570-2500) so that the electronic reticle becomes yellow.



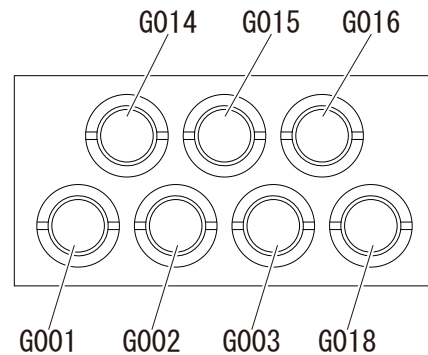
- 2) Press the start button to measure the corneal curvature radius (R) of G014.
- 3) Confirm that the measurement MAX and MIN values are within the range of the entered numeric value $\pm 0.15 \text{ mm}$ for the model eye.

 Note	If the MAX and MIN values are outside the range of the entered numeric value $\pm 0.15 \text{ mm}$ for the model eye, they appear in red.
--	---



- 4) If the MAX and MIN values appear in red, press the CCD button and confirm that there is no dust on the model eye image of the pachy calibration jig (18570-2500). Press the start button again to perform measurement.

- 11 . Measure G015 and G016 of the pachy calibration jig (18570-2500) in the same procedure as G014.

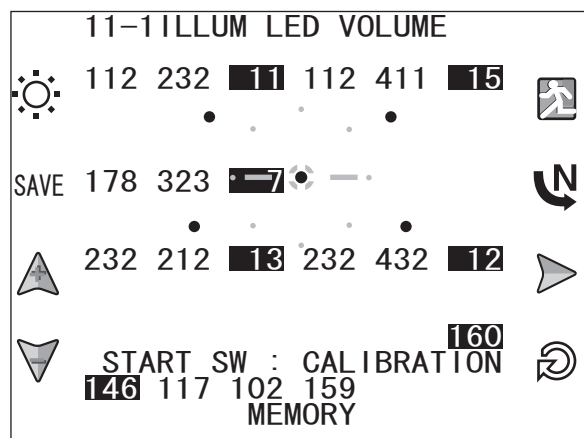


12. Confirm that the MAX and MIN values of the corneal curvature radius (R) for each model eye are as follows:
- 1) For G015: The entered numeric value ± 0.30 mm
 - 2) For G016: The entered numeric value ± 0.55 mm
13. If the center corneal thickness (CCT) and corneal curvature radius (R) values do not satisfy the specifications, perform the following.
- 1) Pachy calibration ([See 8.4.3 \[p168\].](#))

8.5 Others


8.5.1 Intensity of LED for corneal illumination

- 1 . Attach the model eye (CL) (32961-0700) to the chinrest.
- 2 . Enter adjustment mode to select "11.
ILLMU LED VOLUME" ([see 8.1.1 \[p119\]](#)).
- 3 . Align the model eye (CL).
- 4 . Press the start button to perform calibration.

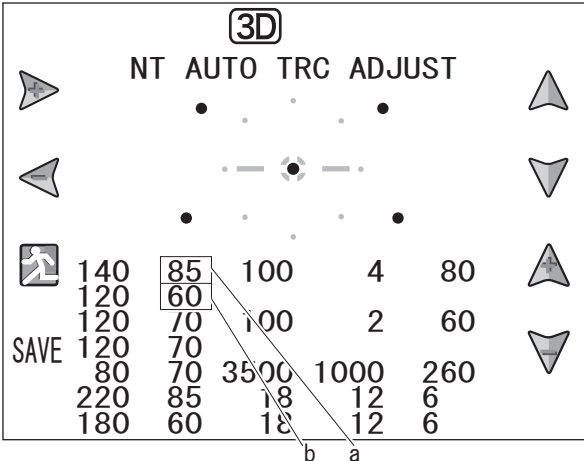


8.5.2 AUTO TRC ADJUST







- 1 . Attach the model eye (CL) (32961-0700) to the chinrest.
- 2 . Enter adjustment mode to select “12. NT TRC ADJUST” (see 8.1.1 [p119]).
- 3 . Align the model eye (CL).
- 4 . Move the chinrest up and down to check the measuring unit auto tracking of the model eye (CL).


 Caution





Confirm that auto tracking moves to the right and left, up and down, and front and back smoothly.
Overshoot does not occur more than four times.



- 5 . If overshoot occurs five times or more, adjust the parameter by the following procedure so that overshoot will not occur more than four times.

- 1) Press the up button  or down button  to select the following values.
 - a . Numeric value for the upward direction
 - b . Numeric value for the downward direction
- 2) Press the following buttons to change the numeric value.
 - a . Up+ button 
 - b . Right+ button 
 - c . Down- button 
 - d . Left- button 

 Note


Pressing the up+ button  and down- button  increases or decreases the value in 1 increments while the right+ button  and left- button  in 5 increments.
As each value increases, the auto tracking speed becomes faster, and as the value decreases, the speed becomes slower.
Increasing each value too much destabilizes auto tracking movement.

- 3) Press the SAVE button to save the setting.

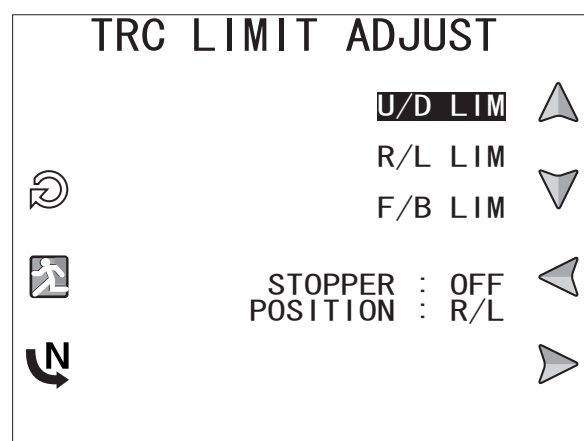
8.5.3 TRC LIMIT ADJUST

1 . Enter maintenance mode to select "4. TRACKING CHECK" ([see 8.1.4 \[p122\]](#)).

2 . Press the up button  or down button

 to select the following.

- 1) U/D LIM: Checks the operation of the measuring unit up/down limit sensor.
- 2) R/L LIM: Checks the operation of the measuring unit right/left limit sensor.
- 3) F/B LIM: Checks the operation of the measuring unit forward/backward limit sensor.




3 . Press the right button  or left button  to confirm that "LIM" in each item is displayed in pink.

4 . Confirm that any cover does not interfere while checking each sensor operation.

5 . If any cover interferes, adjust the positions of the following sensors.

1) U/D sensor (18536-EA47) ([See 7.3.4 \[p104\].](#))

2) R/L sensor (18537-EA45) ([See 7.3.8 \[p108\].](#))

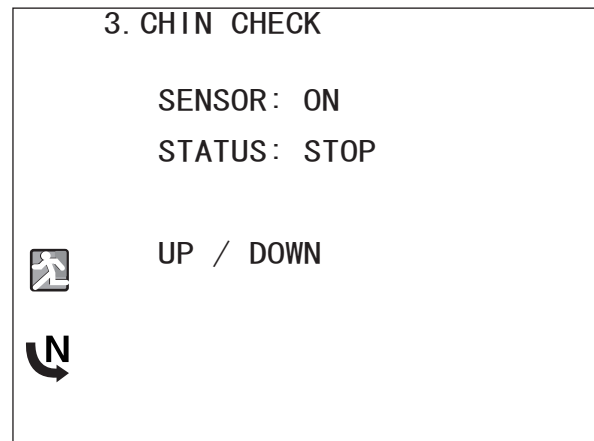
 Note	NT-530/NT-530P only
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3) F/B sensor (18537-EA46) ([See 7.3.9 \[p108\].](#))


 Note	NT-530/NT-530P only
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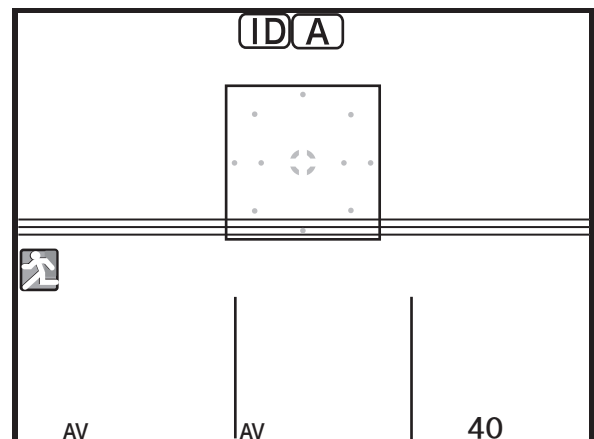
8.5.4 CHIN CHECK

- 1 . Enter maintenance mode to select "3. CHIN CHECK" ([see 8.1.4 \[p122\]](#)).
- 2 . Press the chinrest up/down button to confirm that the following are displayed.
 - 1) When the chinrest down button is pressed and the chinrest is moved to the lower limit, "DOWN LIMIT" is displayed.
 - 2) When the chinrest up button is pressed and the chinrest is moved to the upper limit, "UP LIMIT" is displayed.
 - 3) Confirm that any abnormal sound is not produced while checking each sensor operation.



8.5.5 CURSOR BOARD

- 1 . Enter inspection mode and press  ([see 8.1.5 \[p123\]](#)).
- 2 . Confirm that pink lines appear on all four corners of the TFT color LCD (80607-00024) monitor.
- 3 . If they do not appear, adjust the position of the LCD front cover (30611-M715) ([see 6.13 \[p75\]](#)).



8.6 Settings After Replacement of Measuring Unit

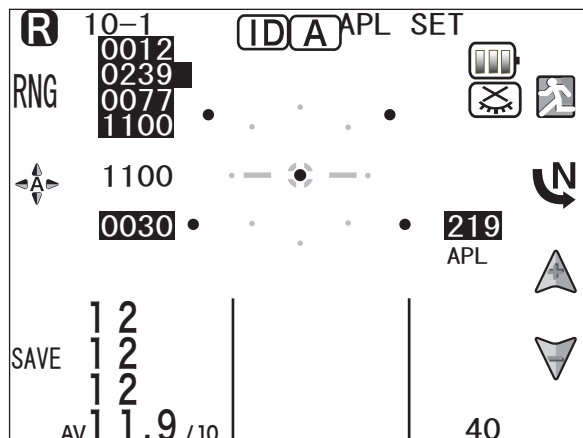
8.6.1 APL gain and A/B constant settings

1 . Enter adjustment mode to select “10. INPUT CONST” (see 8.1.1 [p119]).

2 . Press the up+ button  or down- button

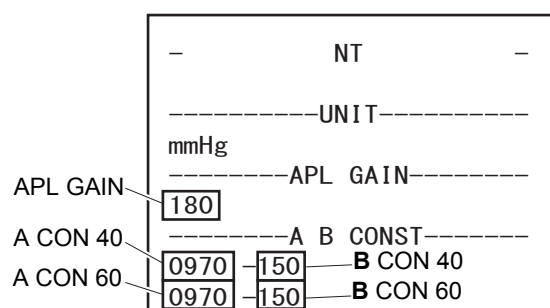
 to input APL GAIN.


3 . Press the SAVE button to save the setting.




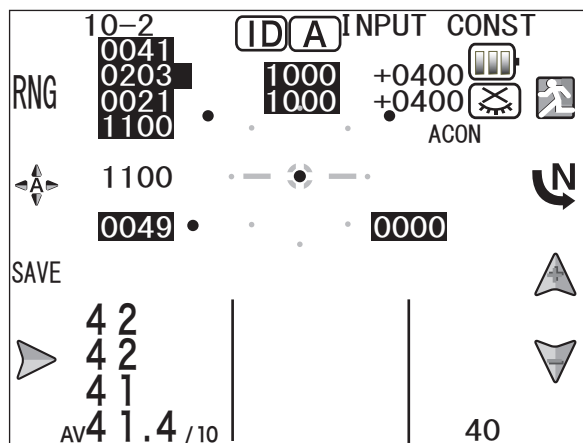
Note




The positions of APL GAIN and A/B constant values are indicated on the provided parameter printout as shown to the right.



4 . Press the next button  to display “10-2 INPUT CONST”.

5 . Press and hold the right button  to allow ACON and BCON of each measurement range to be input.



6 . Press and hold the right button  to select the following items, then press the up+ button  or down- button  to input each value.

1) ACON40

2) BCON40

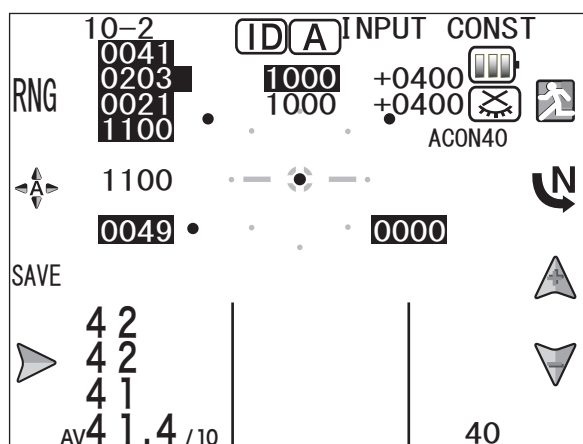
3) ACON60

4) BCON60

7 . Press the SAVE button to save the setting.


8 . Perform the following.



1) Solenoid brake setting (See 8.6.2 [p194].)





8.6.2 Solenoid brake setting

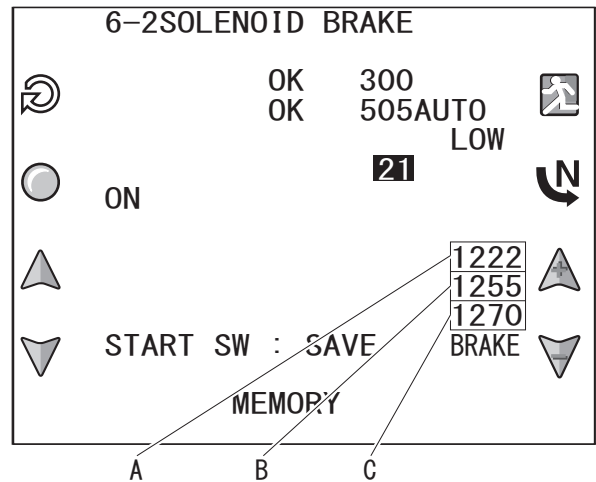
1 . Enter adjustment mode to select “6. SOLENOID” (see 8.1.1 [p119]).


2 . Press the next button  to display “6-2SOLENOID BRAKE”.

3 . Press the up button  or down button  to select the values of the following solenoid brakes.

- 1) A: BRAKE 1
- 2) B: BRAKE 2
- 3) C: BRAKE 3


4 . Press the up+ button  or down- button  to input each value.





 Note The positions of BRAKE 1, 2, 3, and each RNG current amount values are indicated on the provided parameter printout as shown to the right.

RNG40 current		NT SOLENOID CTRL		RNG60 current	
181	180	202	203		
1200	1400	1415			
BRAKE 1		BRAKE 2		BRAKE 3	

5 . Press the SAVE button to save the setting.

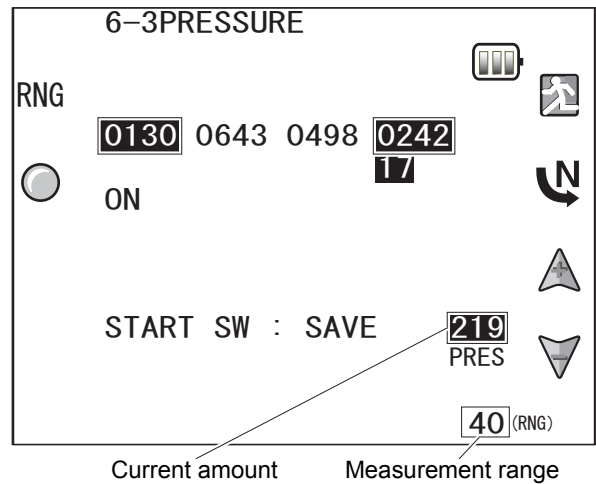
6 . Press the next button  and set the measurement range to 40 or 60.

7 . Press the up+ button  or down- button  to input the current amount when the measurement range is set to 40 or 60.

8 . Press the SAVE button to save the setting.





9 . Perform the following.

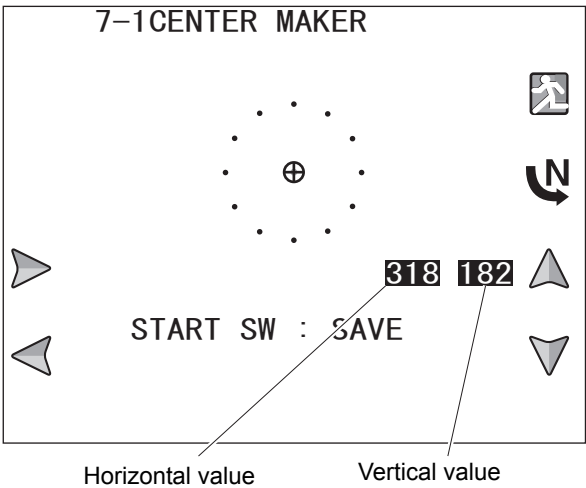
- 1) Reference marker setting (See 8.6.3 [p195].)


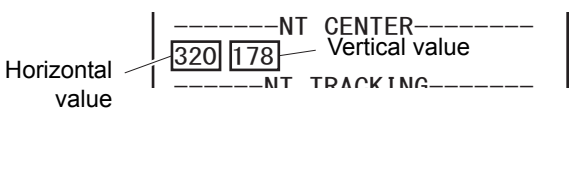


8.6.3 Reference marker setting

- 1 . Enter adjustment mode to select “7. APL CENTER” (see 8.1 [p119]).
- 2 . Input the reference marker value by the following procedure.



- 1) Press the up button  or down button  to input the vertical value.
- 2) Press the left button  or right button  to input the horizontal value.

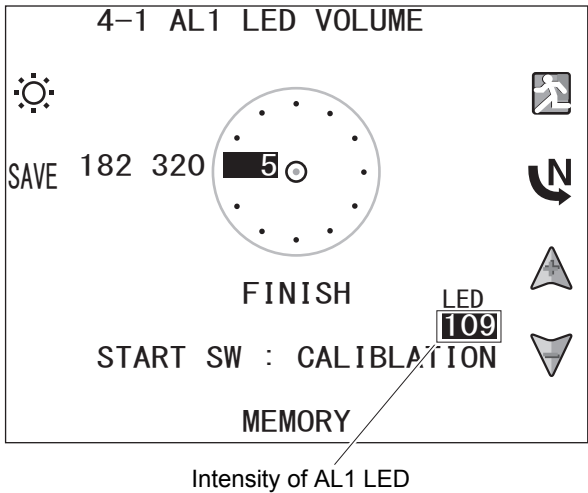



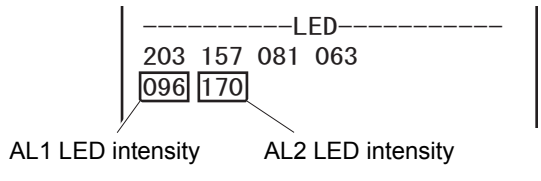
 Note	The positions of horizontal and vertical reference marker values are indicated on the provided parameter printout as shown to the right.	
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- 3 . Press the SAVE button to save the setting.
- 4 . Perform the following.
 - 1) AL1 LED intensity setting (See 8.6.4 [p196].)

8.6.4 AL1 LED intensity setting




- 1 . Enter adjustment mode to select “4. OFFSET VOLTAGE” (see 8.1.1 [p119]).
- 2 . Press the up+ button  or down- button  to input the intensity of AL1 LED.

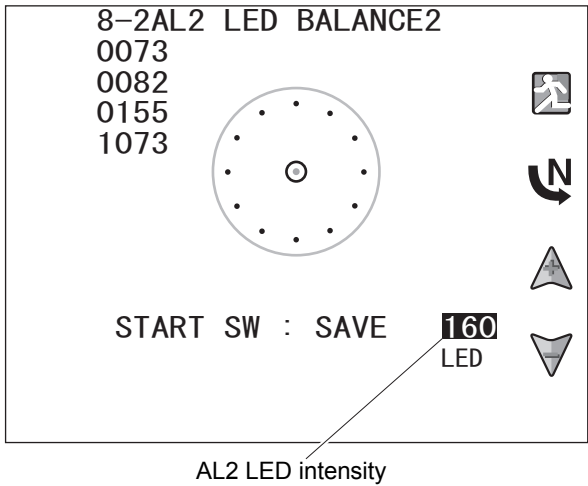



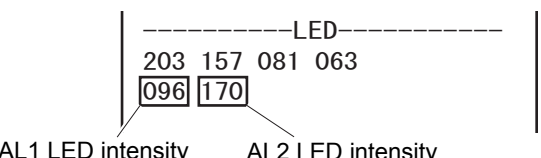
 Note	The position of AL1 LED intensity value is indicated on the provided parameter printout as shown to the right.	 <p>AL1 LED intensity AL2 LED intensity</p>
--	--	--

- 3 . Press the SAVE button to save the setting.
- 4 . Perform the following.
 - 1) AL2 LED intensity setting (See 8.6.5 [p196].)

8.6.5 AL2 LED intensity setting

- 1 . Enter adjustment mode to select “8. CAMERA2” (see 8.1.1 [p119]).
- 2 . Press the next button  to display “8-2AL2 LED BALANCE2”.
- 3 . Press the up+ button  or down- button  to input the intensity of AL2 LED.




 Note	The position of AL2 LED intensity value is indicated on the provided parameter printout as shown to the right.	 <p>AL1 LED intensity AL2 LED intensity</p>
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
- 4 . Press the SAVE button to save the setting.
- 5 . Perform the following.
 - 1) Model eye measurements (See 8.3.13 [p151].)

8.7 Software Upgrade


- 1 . Turn off power to the device.
- 2 . Connect the USB flash drive (30670-E004) to the USB-A connector of the main body.

 Note	USB flash drive: If the USB flash drive (30670-E004) is not available, it is recommended to use a USB flash drive manufactured by SanDisk. However, the device may not recognize the USB flash drive even if it is a SanDisk product.
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
- 3 . Turn on the power to the device.
- 4 . When two or more upgrade files are saved in the USB flash drive (30670-E004), the SELECT FILE screen is displayed.

 Note	The SELECT FILE screen is displayed only when two or more upgrade files are saved in the USB flash drive.
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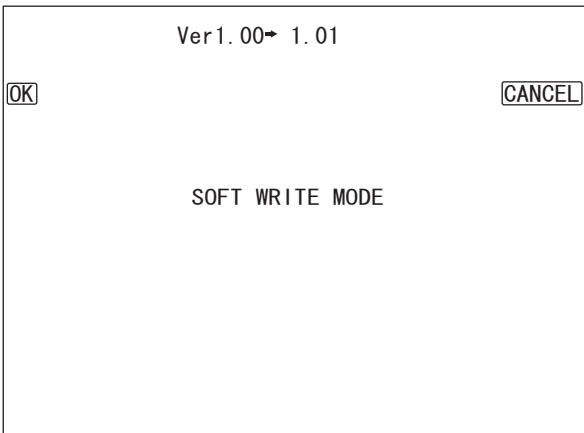


 Caution	When saving the upgrade file to the USB flash drive, save it to a root directory. Do not create a folder to save the file to.
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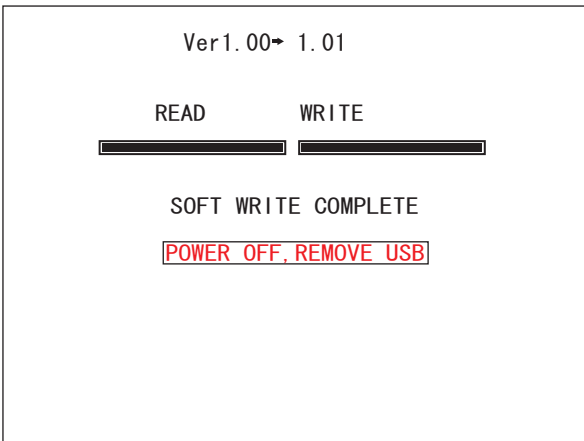
- 5 . The upgrade software is "nt5_softwrite_V***.mot".

 Note	"***" indicates the version No.
--	---------------------------------

- 6 . Press the button of the upgrade file.
- 7 . The upgrade confirmation screen is displayed.
- 8 . Press "OK".
- 9 . The screen as shown to the right appears and upgrade starts.



- 10 . When the upgrade is complete, the screen as shown to the right appears. Turn off the power.
- 11 . Disconnect the USB flash drive.
- 12 . Turn on the power and confirm that the device starts properly.
- 13 . If the upgrade failed, turn off the power then perform upgrade again.



8.8 EEPROM Backup



Caution




The EEPROM backup


Perform the following to back up the parameter settings.

BACKUP (See 8.10.1 [p200].)

- 1 . Enter NT adjustment mode to select “13. PARAMETER SETTING” (see 8.1.1 [p119]).

MENU		
<input checked="" type="checkbox"/>	1. AL1_2 LED FOCUS	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	2. CAMERA1	
<input checked="" type="checkbox"/>	3. APL OPTICS AXIS	
<input checked="" type="checkbox"/>	4. OFFSET VOTAGE	
<input checked="" type="checkbox"/>	5. FIX OPTICS AXIS	
<input checked="" type="checkbox"/>	6. SOLENOID	
<input checked="" type="checkbox"/>	7. APL CENTER	
<input checked="" type="checkbox"/>	8. CAMERA2	
<input checked="" type="checkbox"/>	9. FOCUS CHECK	
<input checked="" type="checkbox"/>	10. INPUT CONST	
<input checked="" type="checkbox"/>	11. ILLUM LED VOLUME	
<input checked="" type="checkbox"/>	12. NT TRC ADJUST	
<input checked="" type="checkbox"/>	13. PARAMETER SETTING	

- 2 . Press the up button  or down button  to select the language of each shipping destination.
- 3 . Press the execute button  and confirm that “OK” is displayed at the bottom of the screen.
- 4 . Turn off and on the power switch.

13. PARAMETER SETTING	
JAPAN	
FOREIGN	
INC	
CHINA	
	
OK	

8.9 Restoring EEPROM Data



Caution

Perform this procedure only when the driver board (18536-BA03) is replaced. Wrong operation may delete the adjustment data saved in the driver board (18536-BA03).

- 1 . Enter adjustment mode to select "14. EEPROM ERROR DISP" (see 8.1.1 [p119]).



When ERR001 occurs, the background of the erroneous item turns red.

- 2 . Press the reset button .

14 EEPROM ERROR DISP

FUSE



SHIPMENT



NT_AB_CON
NT_CENTER
NT_RET I
NT_SOL
NT_APL

- 3 . Press the right button or left button to select "Yes" and press the execute button .



The backup data is restored to the driver board (18536-BA03) from the main board (18536-BA01).

EEPROM OVERWRITE

CAUTION!

EEPROM OVERWRITE
BACKUP DATA ?

Yes No



- 4 . When the screen is displayed as shown to the right, press the exit button twice and turn off the power switch.

EEPROM OVERWRITE

CAUTION!


EEPROM WRITING NOW

WRITING OK





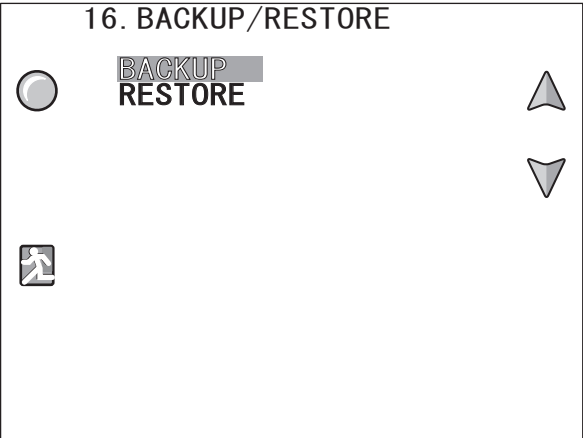
8.10 BACKUP / RESTORE


8.10.1 BACKUP



 Caution	On devices with V1.05 or earlier installed, the parameter settings backed up on the main board are the default values. Performing “BACK UP” on devices with V1.06 installed saves the parameter settings at that time to the main board.
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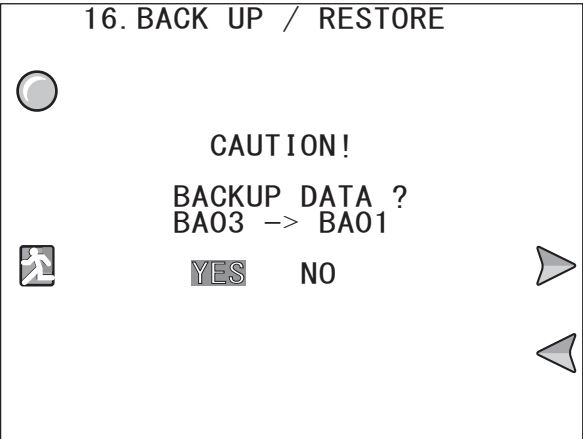
1 . Enter adjustment mode to select “16. BACKUP / RESTORE” (see 8.1.1 [p119]).


2 . Press the up button  or down button  to select “BACKUP”.




3 . Press the execute button  to display the BACKUP screen.

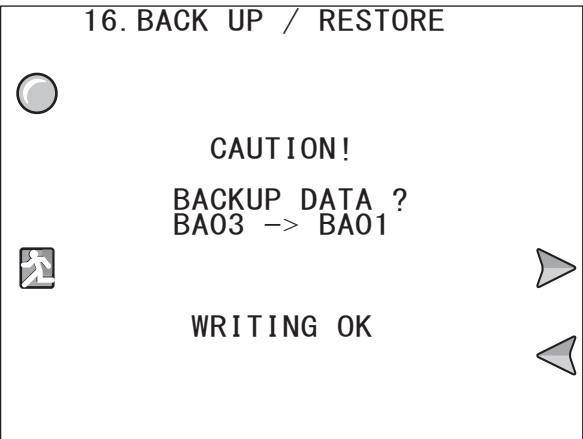
4 . Press the right button  or left button  to select “YES”.



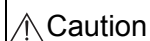
5 . Press the execute button  to back up the parameter settings to the main board.

6 . After the backup is complete, confirm that “WRITING OK” is displayed.

7 . Press the exit button  twice and turn off the power switch.



8.10.2 RESTORE




Caution

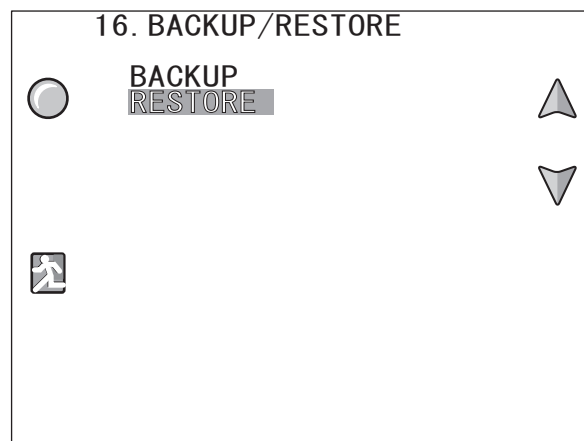
On devices with V1.05 or earlier installed, the parameter settings backed up on the main board are the default values.


Performing "RESTORE" on devices with V1.05 or earlier installed after the driver board (18536-BA03) is replaced restores the parameter settings only to the default values.

1 . Enter adjustment mode to select "16. BACKUP / RESTORE" ([see 8.1.1 \[p119\]](#)).

2 . Press the up button  or down button

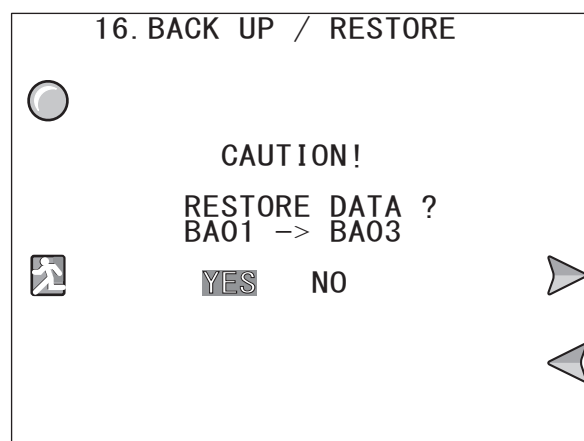
 to select "RESTORE".




3 . Press the execute button  to display the RESTORE screen.


4 . Press the right button  or left button

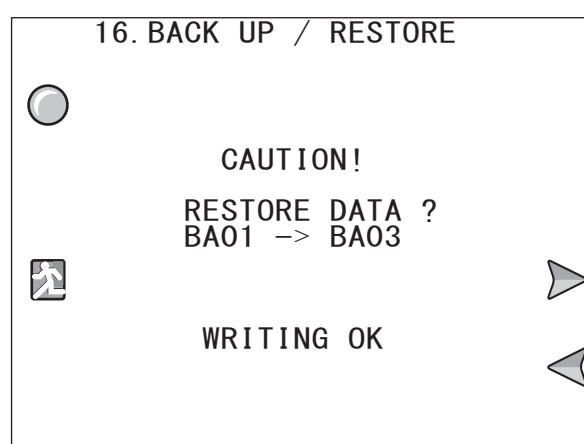
 to select "YES".



5 . Press the execute button  to restore the parameter settings to the driver board (18536-BA03).

6 . When restore is complete, confirm that "WRITING OK" is displayed.

7 . Press the exit button  twice and turn off the power switch.



8.11 Network


- 1 . Enter PARAMETER SETTING mode to select "51. NETWORK" (see 8.1.6 [p125]).


- 2 . Press the up button  or down button

 to select the desired item.

- 3 . Set the network.

- 1) Select "51. NETWORK".

- 2) Press the right button  or left but-



ton  to switch to "ON" or "OFF".

a . ON: Network-connected

b . OFF: Network-unconnected

- 4 . Set DHCP.

- 1) Select "52. DHCP".

- 2) Press the right button  or left button  to switch to "ON" or "OFF".

a . ON: DHCP-connected

b . OFF: DHCP-unconnected

- 5 . Set the IP address.



Caution


When "52. DHCP" is set to "YES", the IP address indicates "0.0.0.0" and it cannot be selected.

- 1) Select "53. IP".





Note

Selecting "53. IP" displays the execute button .

- 2) Press the execute button  to display the IP address entry screen.

- 3) Change the IP address by the following procedure.

- a . Press  or  to move the cursor.


- b . Press the right button  or



left button  to change the numeric value.



Note

The value can also be changed with the joystick.


- c . Press the exit button  to display the IP address change confirmation screen.

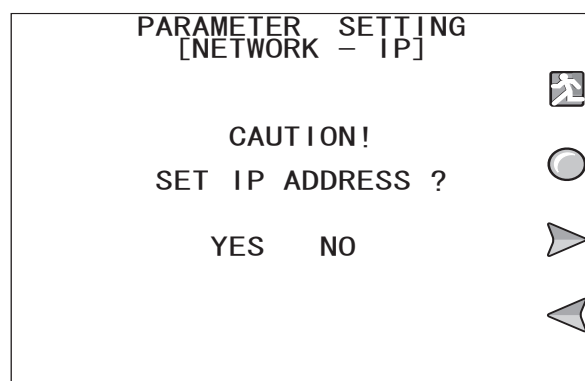
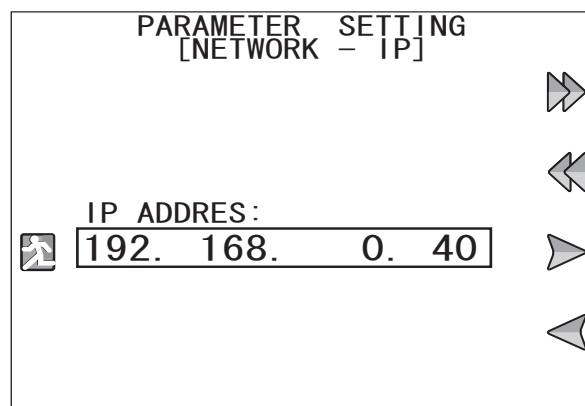
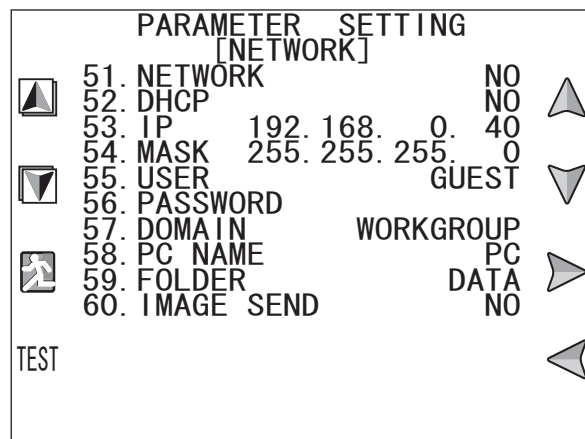
- d . Press the right button  or left button  to select "YES" or "NO".




Note

"YES" or "NO" can also be selected with the joystick.

- e . Press the execute button  or start button to set "YES" or "NO".




6 . Set the subnet mask.

 **Caution** When "52. DHCP" is set to "YES", "MASK" indicates "0.0.0.0" and it cannot be selected.



1) Select "54. MASK".


2) Set the subnet mask in the same procedure as the IP address setting.

7 . Set the user name.



 **Note** Enter the user name that is registered in the connected PC.

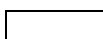
1) Select "55. USER".

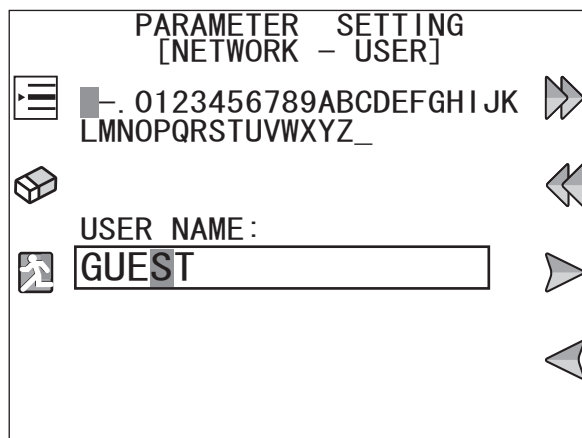
 **Note** Selecting "55. USER" displays the execute button .



2) Press the execute button  to display the user name entry screen.


3) Enter the user name by the following procedure.


a . Press  or  to move the cursor in the list of usable characters.


 **Note** The cursor can also be moved with the joystick.






b . Press  or  to move the cursor in the entry field.

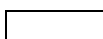
 **Note** The cursor can also be moved with the joystick.

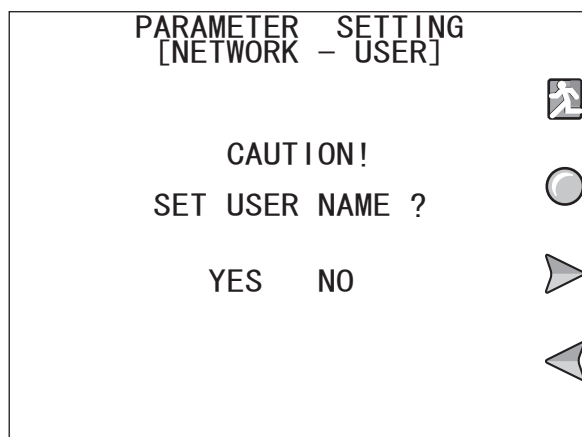
c . Press the OK button  to set the character to be entered. Then move the cursor in the entry field one digit to the right.


d . Press the delete button  to delete a character in the entry field. Then move the cursor one digit to the left.

e . Press the exit button  to display the IP address change confirmation screen.

f . Press the right button  or left button  to select "YES" or "NO".

 **Note** "YES" or "NO" can also be selected with the joystick.



g . Press the execute button  or start button to set "YES" or "NO".

8 . Set the password.



Enter the login password for the user name of the connected PC.

- 1) Select "56. PASSWORD".

Selecting "56. PASSWORD" displays the execute button .

- 2) Set the password in the same procedure as the user name.

9 . Set the domain name.



Enter the domain name of the connected PC.

- 1) Select "57. DOMAIN".

Selecting "57. DOMAIN" displays the execute button .

- 2) Set the domain name in the same procedure as the user name.

10. Set the PC name.



Enter the name of the connected PC.

- 1) Select "58. PC NAME".

Selecting "58. PC NAME" displays the execute button .

- 2) Set the PC name in the same procedure as the user name.

11. Set the folder name.



Enter the shared folder name of the connected PC to which the measured data is transmitted.

- 1) Select "59. FOLDER".

Selecting "59. FOLDER" displays the execute button .

- 2) Set the folder name in the same procedure as the user name.

12. Set the image to be sent.

- 1) Select "60. IMAGE".

- 2) Press the right button
- 
- or left button
- 
- to select "YES", "NO", or "LOW CONF".



The setting can also be changed with the joystick.

a . YES: Sends a pachymetry image.

b . NO: Does not send a pachymetry image.

c . LOW CONF: Sends a measurement image if the pachymetry data is a low-confidence data.

13. Check the network connection.

- 1) Press the TEST button.

- 2) Following a beep, the message below is displayed for two seconds.

a . When the LAN cable is connected properly, "CONNECTION OK" is displayed.

CONNECTION OK

b . When the LAN cable is not connected properly, "ERR771 NO NETWORK CABLE" is displayed.

**ERR771
NO NETWORK CABLE**

8.12 Cleaning

8.12.1 Observation window

- 1 . Blow the dust off with a blower.
- 2 . Wipe the observation window with a cotton swab dampened with ethanol.
- 3 . If any dirt is left, wipe it again with a new cotton swab.
- 4 . If the dirt cannot be removed, wipe with weak neutral detergent or soap solution, then wipe the observation window with a cotton swab slightly dampened with ethanol.

8.12.2 Air nozzle

- 1 . Cut a piece of lens cleaning paper to a proper size.
- 2 . Wrap the lens cleaning paper to the tip of a 1.55 mm hexagonal screwdriver.

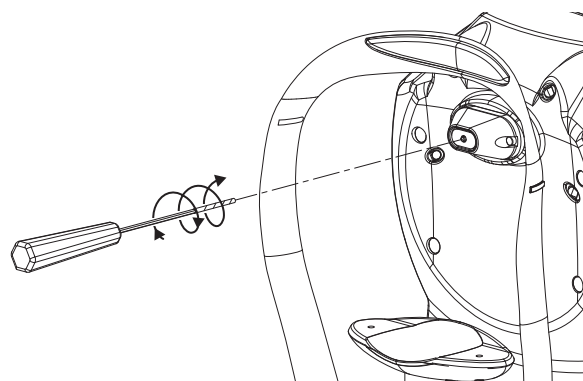


Wrap the paper as tightly as possible.

- 3 . Slightly dampen the lens cleaning paper with ethanol.
- 4 . While rotating the hexagonal screwdriver, slowly insert it into the nozzle.



Take proper care so that the lens cleaning paper is not left inside the nozzle.
Do not move the screwdriver excessively. Doing so may damage the nozzle.



- 5 . Repeat cleaning two or three times.

8.12.3 Pachymetry window

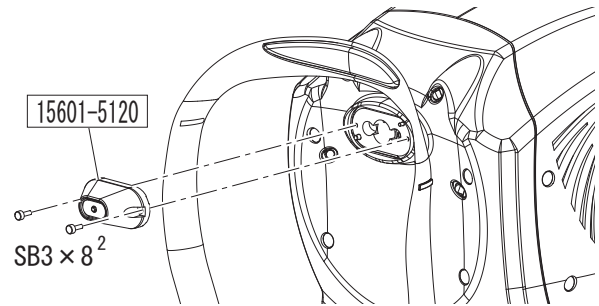


Caution NT-530P only

- 1 . Blow the dust off with a blower.
- 2 . Wipe the pachymetry window with a piece of lens cleaning paper slightly dampened with ethanol.
- 3 . If the dirt cannot be removed, clean it by the following procedure.
 - 1) Wipe the pachymetry window with a cotton swab dampened with ethanol.
 - 2) If any dirt is left, wipe it again with a new cotton swab.
 - 3) Wipe the pachymetry window with the lens cleaning paper slightly dampened with ethanol again.


8.12.4 Window (18536-G0147)

- 1 . Unscrew SB3 × 8 (n = 2) to remove the nozzle ASSY (15601-5120).



- 2 . Clean the window (18536-G017) by the following procedure.

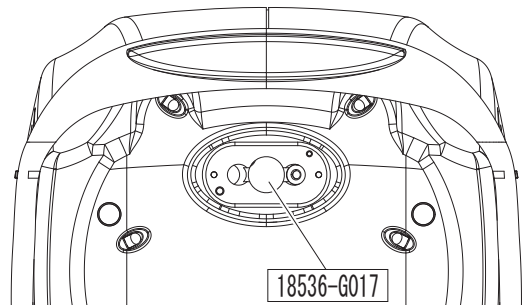
- 1) Dampen a cotton swab with ethanol.
- 2) Clean the window (18536-G017) with the dampened cotton swab.

 Note	If any dirt is left, wipe it again with a new cotton swab.
--	--

- 3 . Reattach the removed nozzle ASSY (15601-5120).

- 4 . Perform the following.

- 1) Puffed air pressure ([See 8.3.9 \[p147\].](#))
- 2) Applanation detector ([See 8.3.11 \[p148\].](#))
- 3) Model eye measurements ([See 8.3.13 \[p151\].](#))
- 4) Pachy inspection ([See 8.4.4 \[p184\].](#))

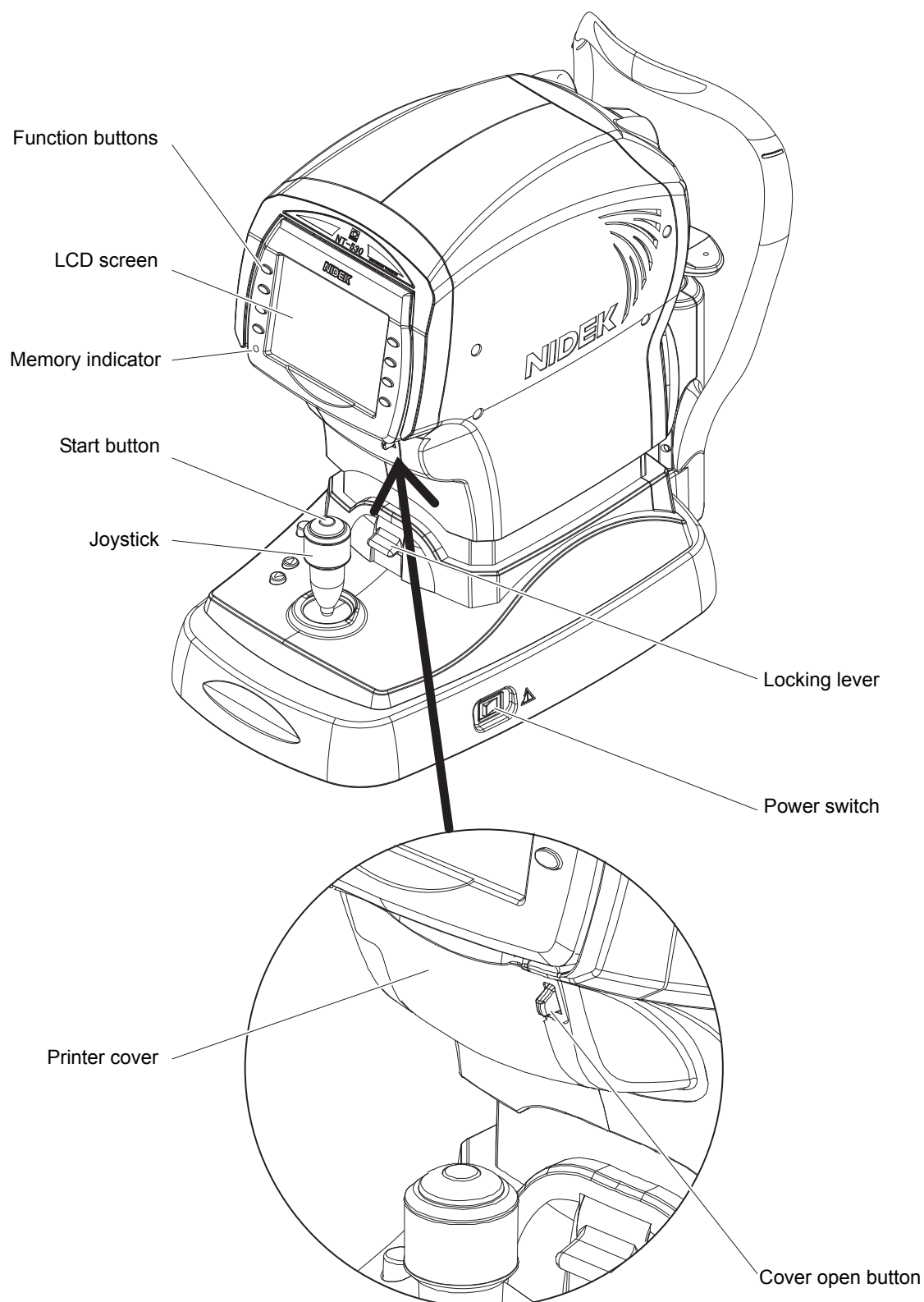


9 SUPPLEMENT

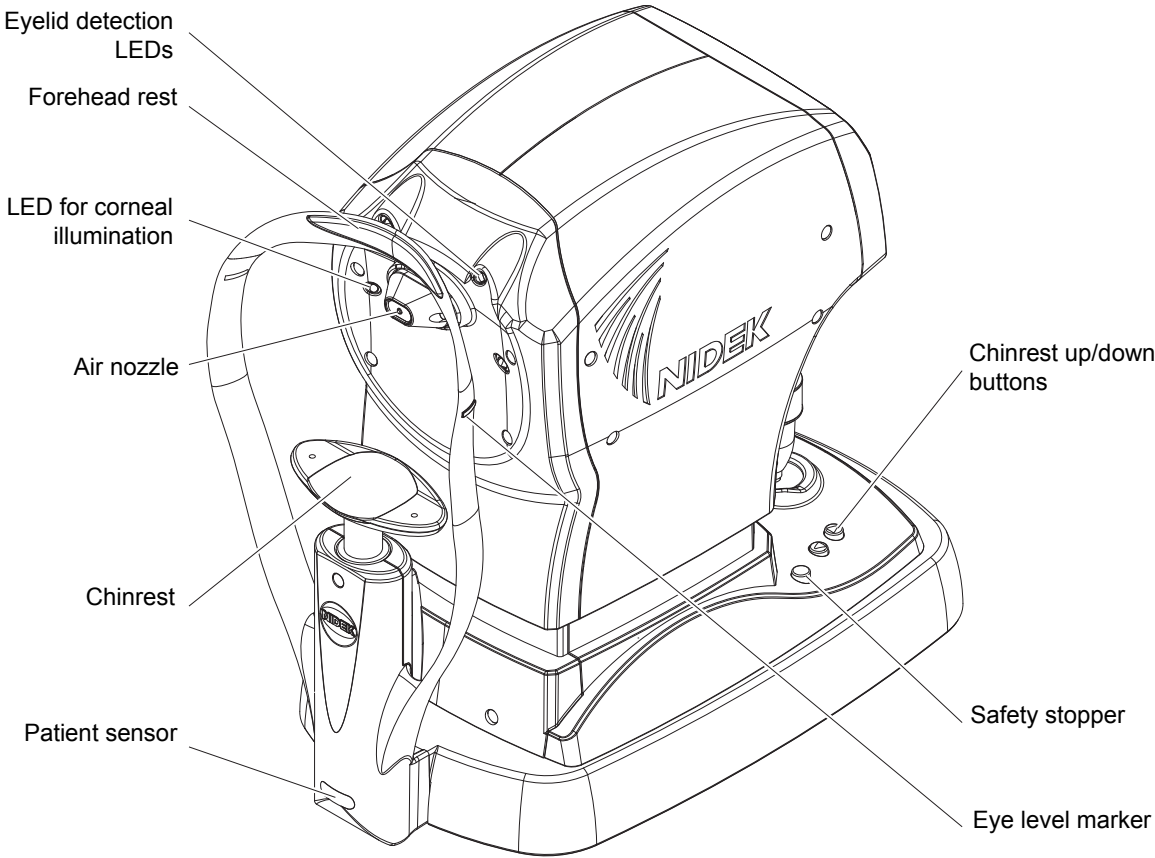
9.1 Configuration

9.1.1 NT-510/NT-530

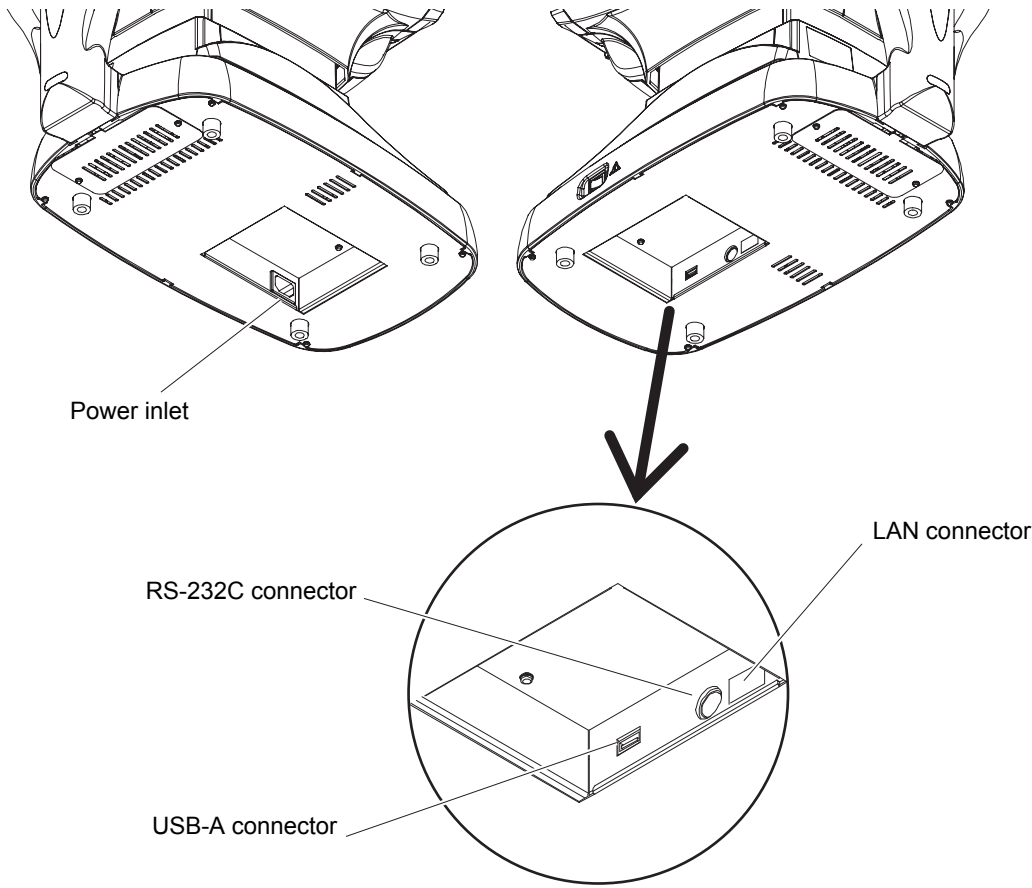
Front view



Rear view

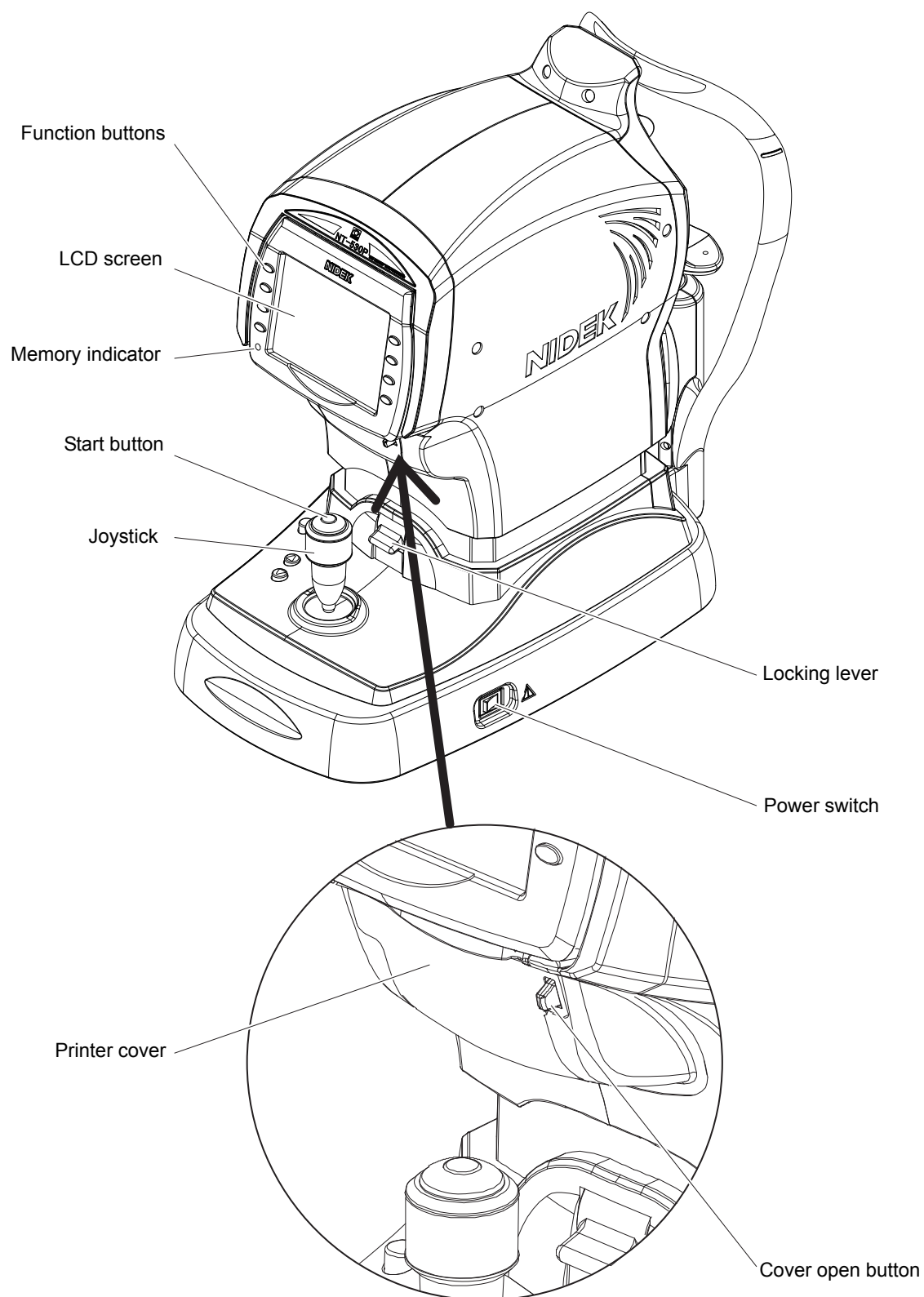


Bottom view

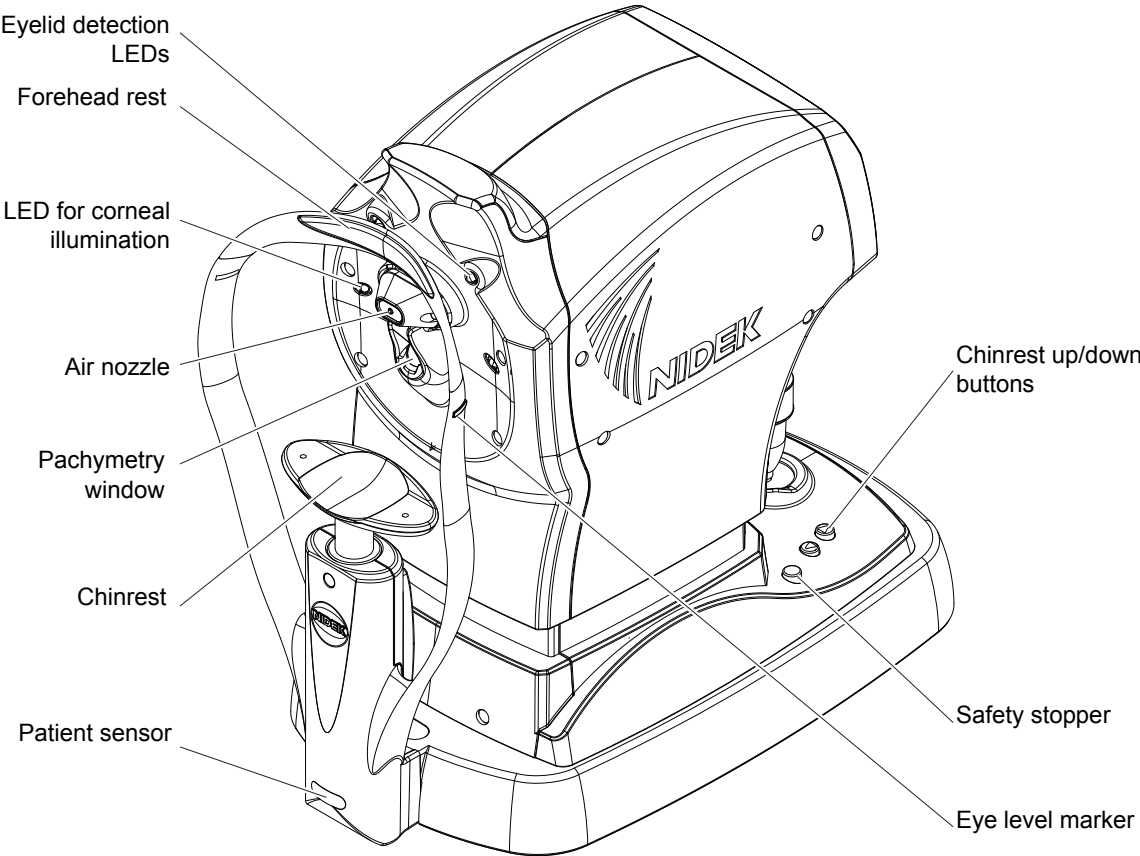


9.1.2 NT-530P

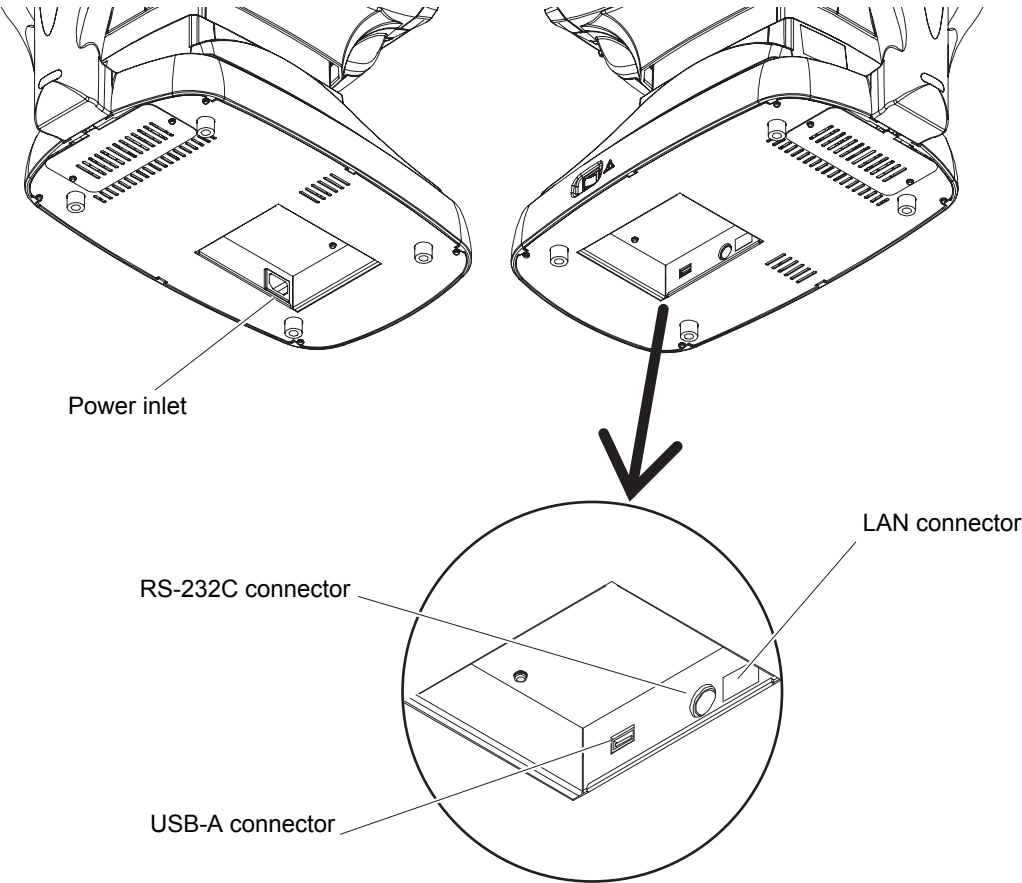
Front view



Rear view



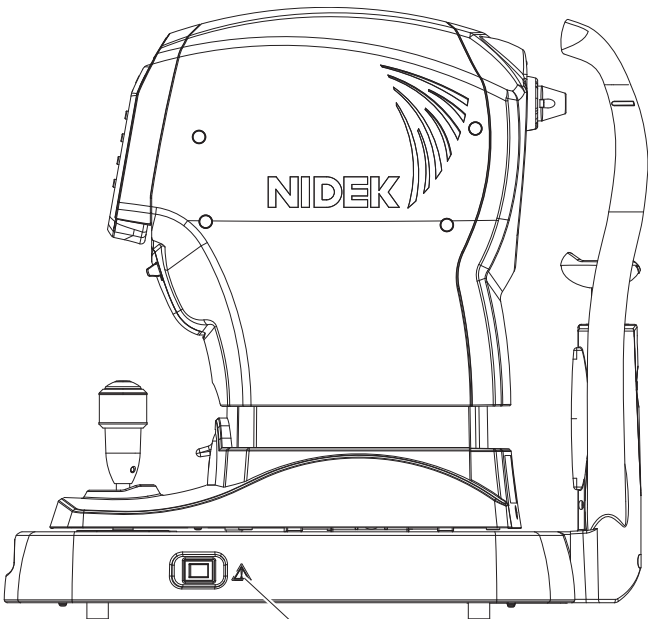
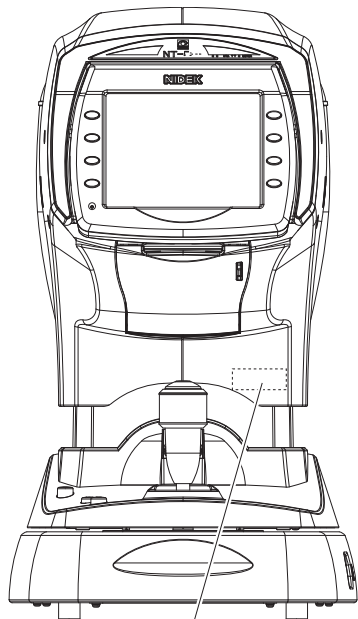
Bottom view







9.2 Labels

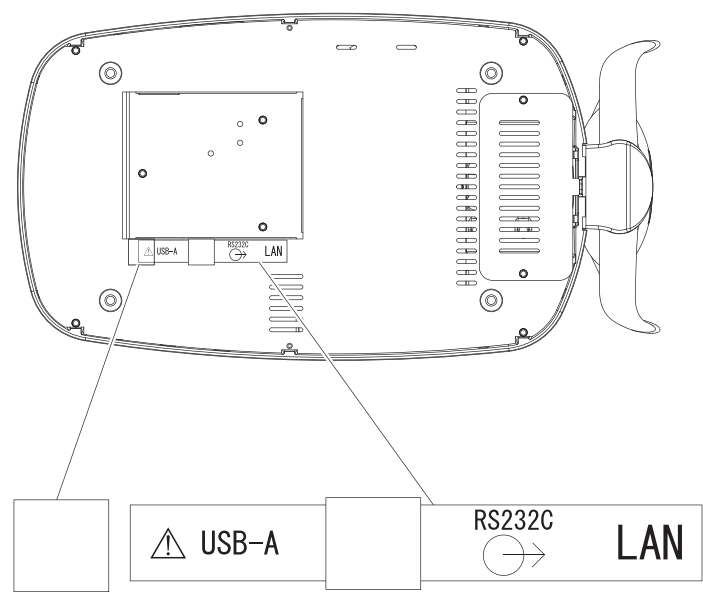
9.2.1 NT-510/NT-530

Front and side views



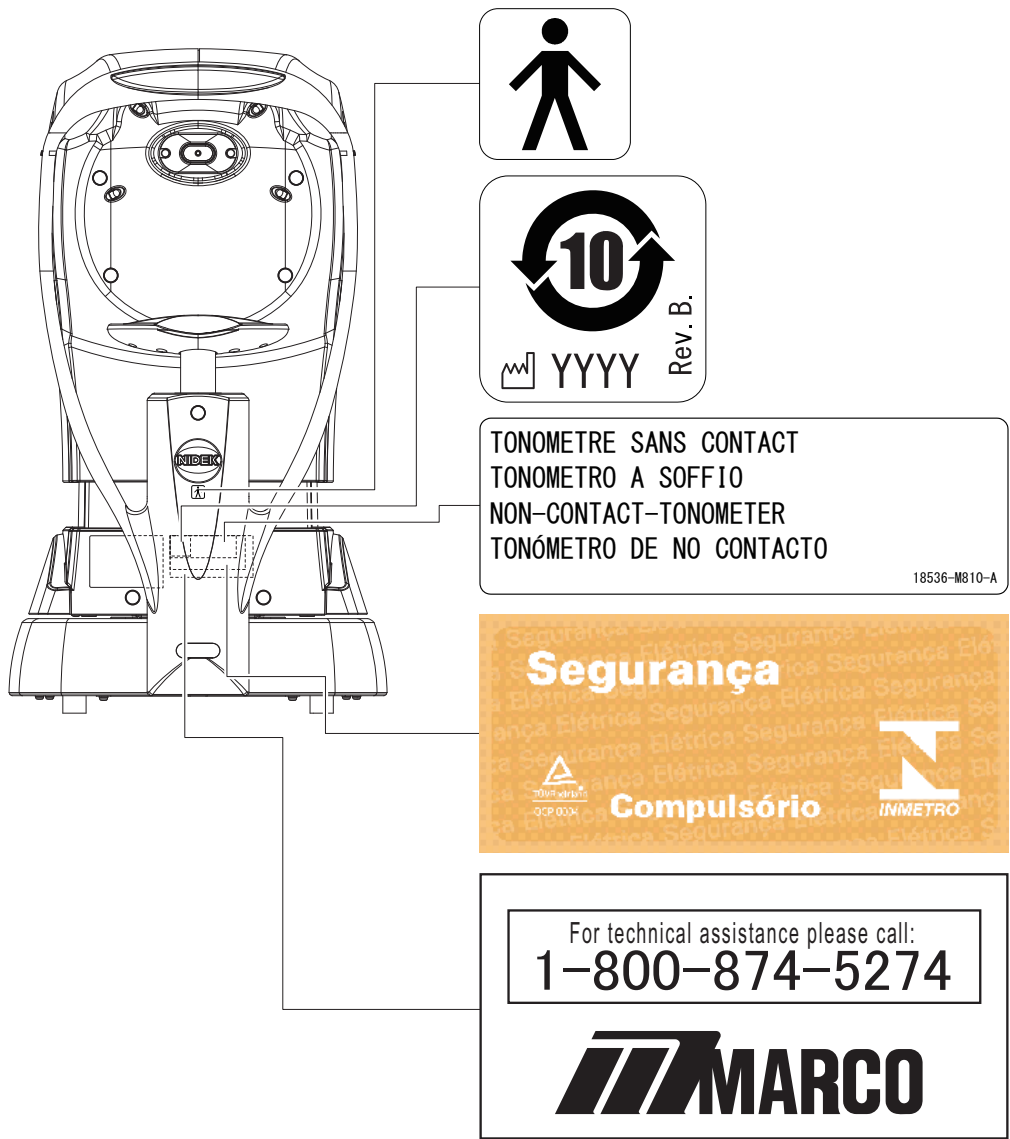
Destination	Label	MARCO logo
Outside Japan	_____	_____
INC		_____
China		_____
Portuguese speaking countries	_____	_____
Canada		

Bottom view















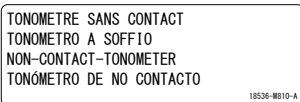

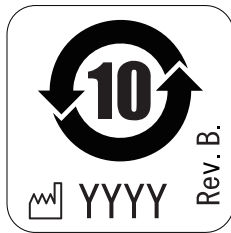
Destination	Communication label	Masking sticker
Outside Japan	<div> <div>⚠ USB-A</div> <div></div> <div>RS232C ↻</div> <div>LAN</div> </div>	<div></div>
INC	<div> <div>⚠ USB-A</div> <div></div> <div>RS232C ↻</div> <div>LAN</div> </div>	<div>_____</div>
China	<div> <div>⚠ USB-A</div> <div></div> <div>RS232C ↻</div> <div>LAN</div> </div>	<div>_____</div>
Portuguese speaking countries	<div> <div>⚠ USB-A</div> <div></div> <div>RS232C ↻</div> <div>LAN</div> </div>	<div></div>
Canada	<div> <div>⚠ USB-A</div> <div></div> <div>RS232C ↻</div> <div>LAN</div> </div>	<div>_____</div>




Rear view



Product name	NT-510		NT-530	
Destination	ID label			
Outside Japan	<div><div>CLASS 1 LED PRODUCT</div><div> NT-510 NON CONTACT TONOMETER</div><div>INPUT 100-240V~ 50/60Hz 100VA </div><div>SER. NO. 13NNNN XXXX</div><div> 34-14 MAEHAMA HIROISHI-CHO GAMAGORI AICHI JAPAN</div><div>CE O123</div><div>MADE IN JAPAN 18536-M802-C</div></div>		<div><div>CLASS 1 LED PRODUCT</div><div> NT-530 NON CONTACT TONOMETER</div><div>INPUT 100-240V~ 50/60Hz 100VA </div><div>SER. NO. 23NNNN XXXX</div><div> 34-14 MAEHAMA HIROISHI-CHO GAMAGORI AICHI JAPAN</div><div>CE O123</div><div>MADE IN JAPAN 18537-M802-C</div></div>	
	INC	<div><div> NT-510 NON CONTACT TONOMETER</div><div>INPUT 100-240V~ 50/60Hz 100VA</div><div>SER. NO. 12NNNN XXXX</div><div>Manufactured for NIDEK Incorporated 47651 Westinghouse Drive Fremont CA 94539 U.S.A. Rx Only</div><div> C US</div><div>MADE IN JAPAN 18536-M803-B</div></div>		<div><div> NT-530 NON CONTACT TONOMETER</div><div>INPUT 100-240V~ 50/60Hz 100VA</div><div>SER. NO. 22NNNN XXXX</div><div>Manufactured for NIDEK Incorporated 47651 Westinghouse Drive Fremont CA 94539 U.S.A. Rx Only</div><div> C US</div><div>MADE IN JAPAN 18537-M803-B</div></div>

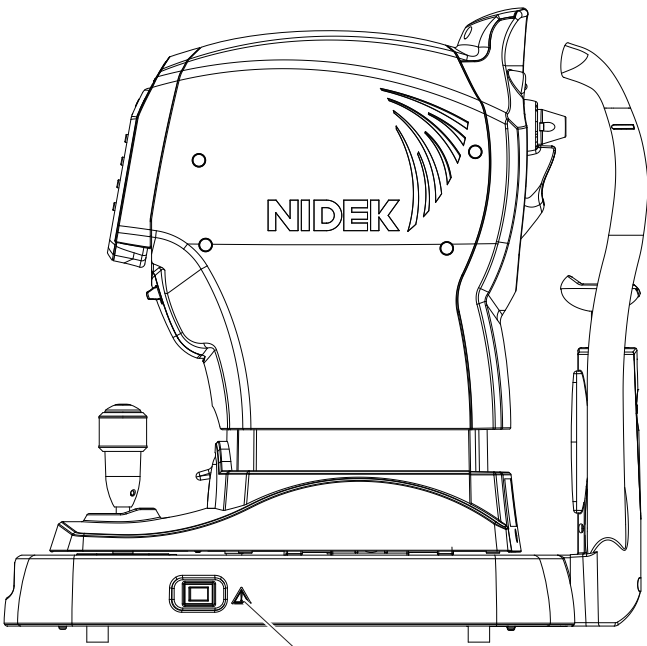
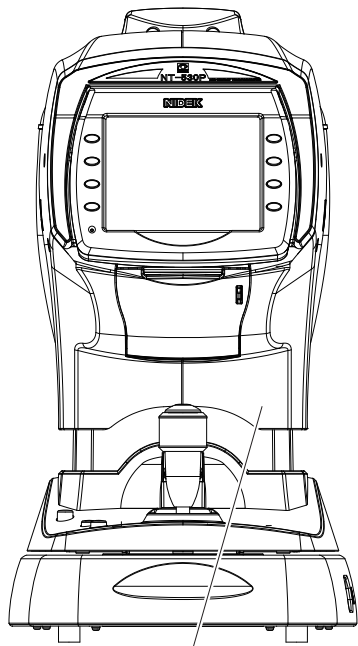
Product name	NT-510		NT-530	
Destination	ID label			
China	<div><div></div><div>型号: NT-510</div><div>产品名称: 非接触式眼压计 输入电源: 100-240V~ 50Hz/60Hz 100VA</div><div></div><div>请勿用力碰撞</div><div>安全类型: I类B型 运行方式: 连续运行 产品标准编号: YZB/JAP 2127-2010 医疗器械注册证书编号: 国食药监械(进)字2010第2223145号 生产企业: NIDEK co.,LTD. 生产者地址: 爱知县蒲郡市拾石町前浜34番地14</div><div>日本制造 MADE IN JAPAN 18536-M806-A</div></div>		<div><div></div><div>型号: NT-530</div><div>产品名称: 非接触式眼压计 输入电源: 100-240V~ 50Hz/60Hz 100VA</div><div></div><div>请勿用力碰撞</div><div>安全类型: I类B型 运行方式: 连续运行 产品标准编号: YZB/JAP 2127-2010 医疗器械注册证书编号: 国食药监械(进)字2010第2223145号 生产企业: NIDEK co.,LTD. 生产者地址: 爱知县蒲郡市拾石町前浜34番地14</div><div>日本制造 MADE IN JAPAN 18537-M806-A</div></div>	
Portuguese speaking countries	<div><div>CLASS 1 LED PRODUCT</div><div></div><div>NT-510</div><div>TONÔMETRO DE NÃO CONTATO</div><div>ENTRADA 100-240V~ 50/60Hz 100VA</div><div>NÚMERO DE SÉRIE 16NNNN</div><div>Declarado Isento de Registro pela ANVISA CADASTRO ANVISA Nº: 80625080009</div><div></div><div>NIDEK co.,LTD. 34-14 Maehama, Hiroishi-cho, Gamagori, Aichi, 443-0038 Japão</div><div>MADE IN JAPAN</div><div> 0123</div><div></div><div>18536-M807-B</div></div>		<div><div>CLASS 1 LED PRODUCT</div><div></div><div>NT-530</div><div>TONÔMETRO DE NÃO CONTATO</div><div>ENTRADA 100-240V~ 50/60Hz 100VA</div><div>NÚMERO DE SÉRIE 26NNNN</div><div>Declarado Isento de Registro pela ANVISA CADASTRO ANVISA Nº: 80625080009</div><div></div><div>NIDEK co.,LTD. 34-14 Maehama, Hiroishi-cho, Gamagori, Aichi, 443-0038 Japão</div><div>MADE IN JAPAN</div><div> 0123</div><div></div><div>18537-M807-B</div></div>	
Canada	<div><div></div><div>NT-510</div><div>NON CONTACT TONOMETER</div><div>INPUT 100-240V~ 50/60Hz 100VA</div><div>SER. NO. 17NNNN</div><div></div><div>NIDEK co.,LTD. 34-14 MAEHAMA HIROISHI-CHO GAMAGORI AICHI JAPAN</div><div>MADE IN JAPAN</div><div></div><div></div><div>18536-M808-A</div></div>		<div><div></div><div>NT-530</div><div>NON CONTACT TONOMETER</div><div>INPUT 100-240V~ 50/60Hz 100VA</div><div>SER. NO. 27NNNN</div><div></div><div>NIDEK co.,LTD. 34-14 MAEHAMA HIROISHI-CHO GAMAGORI AICHI JAPAN</div><div>MADE IN JAPAN</div><div></div><div></div><div>18537-M808-A</div></div>	





Destination	Label		
	Marco Free Dial	Multilingual label	China RoHS label
Outside Japan	—		—
INC		—	—
China	—	—	
Portuguese speaking countries	—	—	—
Canada	—	—	—

Destination	Label	
	INMETRO mark	Type B applied part label
Outside Japan	—	
INC	—	—
China	—	—
Portuguese speaking countries		
Canada	—	—

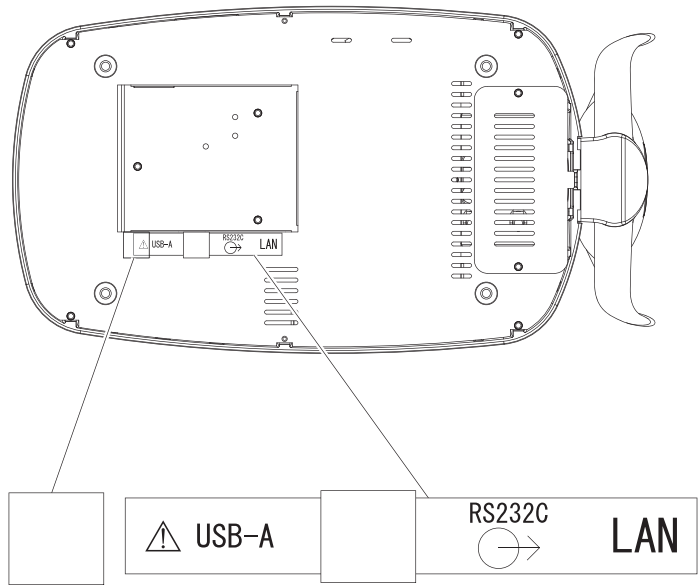
9.2.2 NT-530P











Front and side views



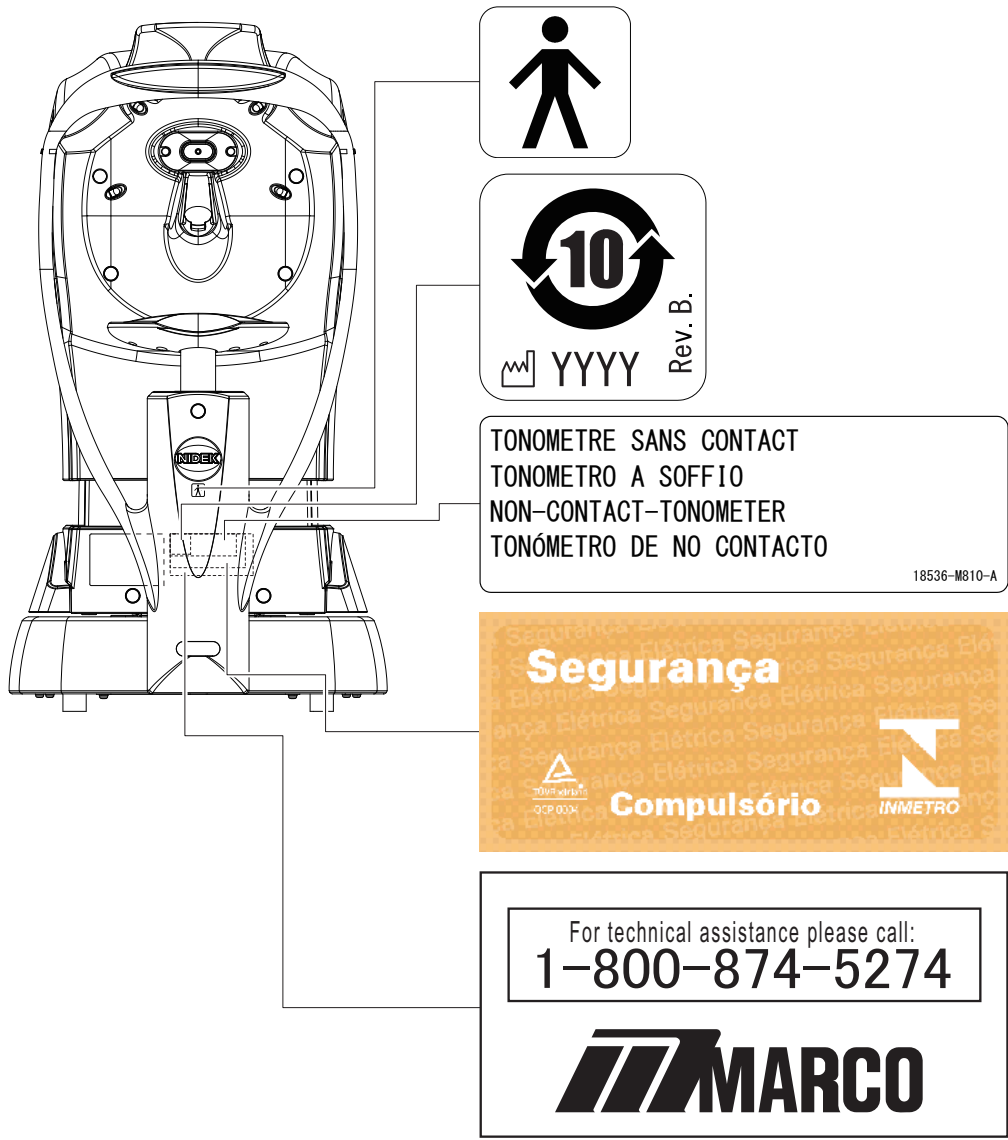
Destination	Caution label	MARCO logo
Outside Japan	_____	_____
INC		_____
China		_____
Portuguese speaking countries	_____	_____
Canada		

Bottom view

























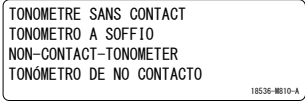

Destination	Communication label	Masking sticker
Outside Japan	<div><div> USB-A</div><div></div><div><div>RS232C</div><div></div><div>LAN</div></div></div>	<div></div>
INC	<div><div> USB-A</div><div></div><div><div>RS232C</div><div></div><div>LAN</div></div></div>	<div></div>
China	<div><div> USB-A</div><div></div><div><div>RS232C</div><div></div><div>LAN</div></div></div>	<div></div>
Portuguese speaking countries	<div><div> USB-A</div><div></div><div><div>RS232C</div><div></div><div>LAN</div></div></div>	<div></div>
Canada	<div><div> USB-A</div><div></div><div><div>RS232C</div><div></div><div>LAN</div></div></div>	<div></div>




Side view



Destination	Labels	
	ID label	Marco Free Dial
Outside Japan	<div><div>CLASS 1 LED PRODUCT</div><div> NT-530P NON CONTACT TONO/PACHYMETER</div><div>INPUT 100-240V~ 50/60Hz 100VA </div><div>SER. NO. 33NNNN XXXX</div><div> NIDEK CO., LTD. 34-14 MAEHAMA HIROISHI-CHO GAMAGORI AICHI JAPAN</div><div> 0123</div><div>MADE IN JAPAN 18538-M802-C</div></div>	<div>—</div>

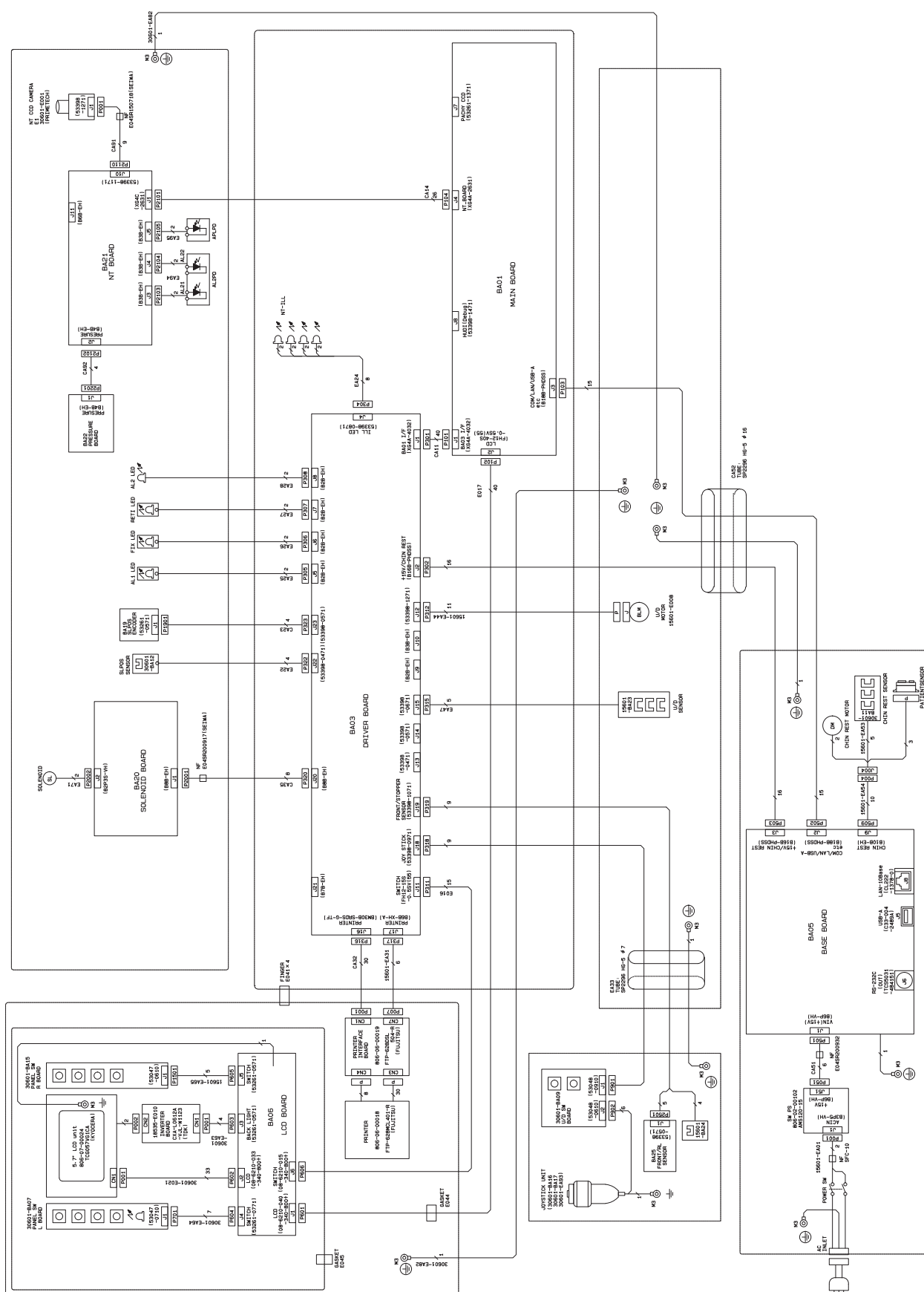
	Labels	
Destination	ID label	Marco Free Dial
INC	 NT-530P NON CONTACT TONO/PACHYMETER INPUT  100-240V~ 50/60Hz 100VA SER. NO. 32NNNN  XXXX Manufactured for NIDEK Incorporated 47651 Westinghouse Drive Fremont CA 94539 U.S.A. Rx Only  MADE IN JAPAN 18538-M803-B	 For technical assistance please call: 1-800-874-5274
China	 型号: NT-530P 产品名称: 非接触式眼压/角膜厚度测量仪 输入电源: 100-240V~ 50Hz/60Hz 100VA   请勿用力碰撞 安全类型: I类B型 运行方式: 连续运行 No. 35NNNN 产品标准编号: YZB/JAP 1950-2010 医疗器械注册证书编号: 国食药监械(进)字2010第2223044号 生产企业: NIDEK co.,LTD. 日本制造 生产者地址: 爱知县蒲郡市拾石町前浜34番地14 MADE IN JAPAN 18538-M806-A	
Portuguese speaking countries	CLASS 1 LED PRODUCT  NT-530P TONÔMETRO DE NÃO CONTATO COM PAQUÍMETRO ENTRADA  100-240V~ 50/60Hz 100VA  NÚMERO DE SÉRIE 36NNNN  XXXX Declarado Isento de Registro pela ANVISA CADASTRO ANVISA N°: 80625080008 NIDEK co.,LTD.   34-14 Maehama, Hiroishi-cho, Gamagori, Aichi, 443-0038 Japão MADE IN JAPAN 18538-M807-B	
Canada	 NT-530P NON CONTACT TONO/PACHYMETER INPUT  100-240V~ 50/60Hz 100VA SER. NO. 37NNNN  XXXX NIDEK co.,LTD.   34-14 MAEHAMA HIROISHI-CHO GAMAGORI AICHI JAPAN MADE IN JAPAN 18538-M808-A	

Destination	Labels	
	Multilingual label	China RoHS label
Outside Japan		—
INC	—	—
China	—	
Portuguese speaking countries	—	—
Canada	—	—

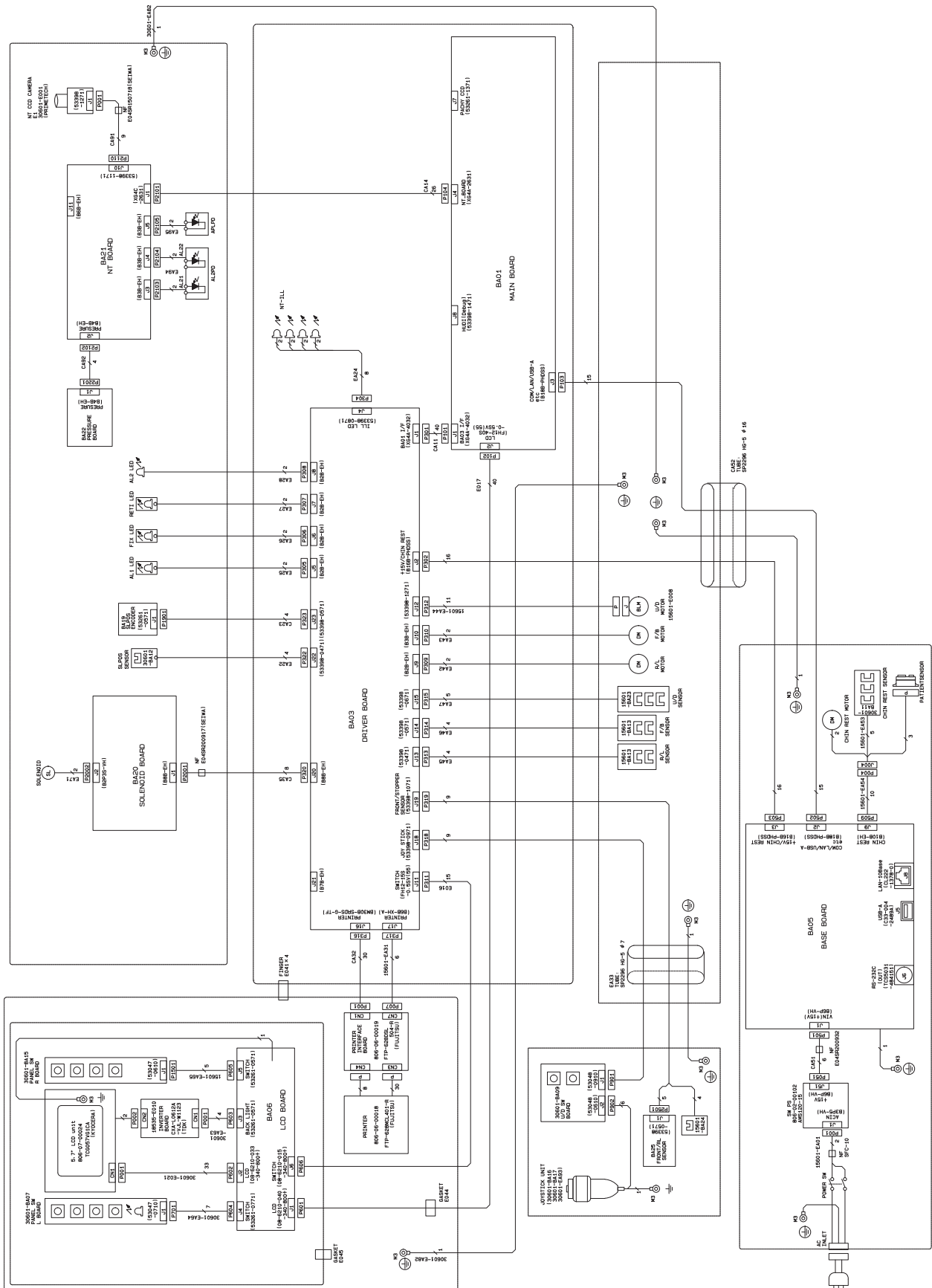
Destination	Labels	
	INMETRO mark	Type B applied part label
Outside Japan	—	
INC	—	—
China	—	—
Portuguese speaking countries		
Canada	—	—

9.3 Wiring Diagram

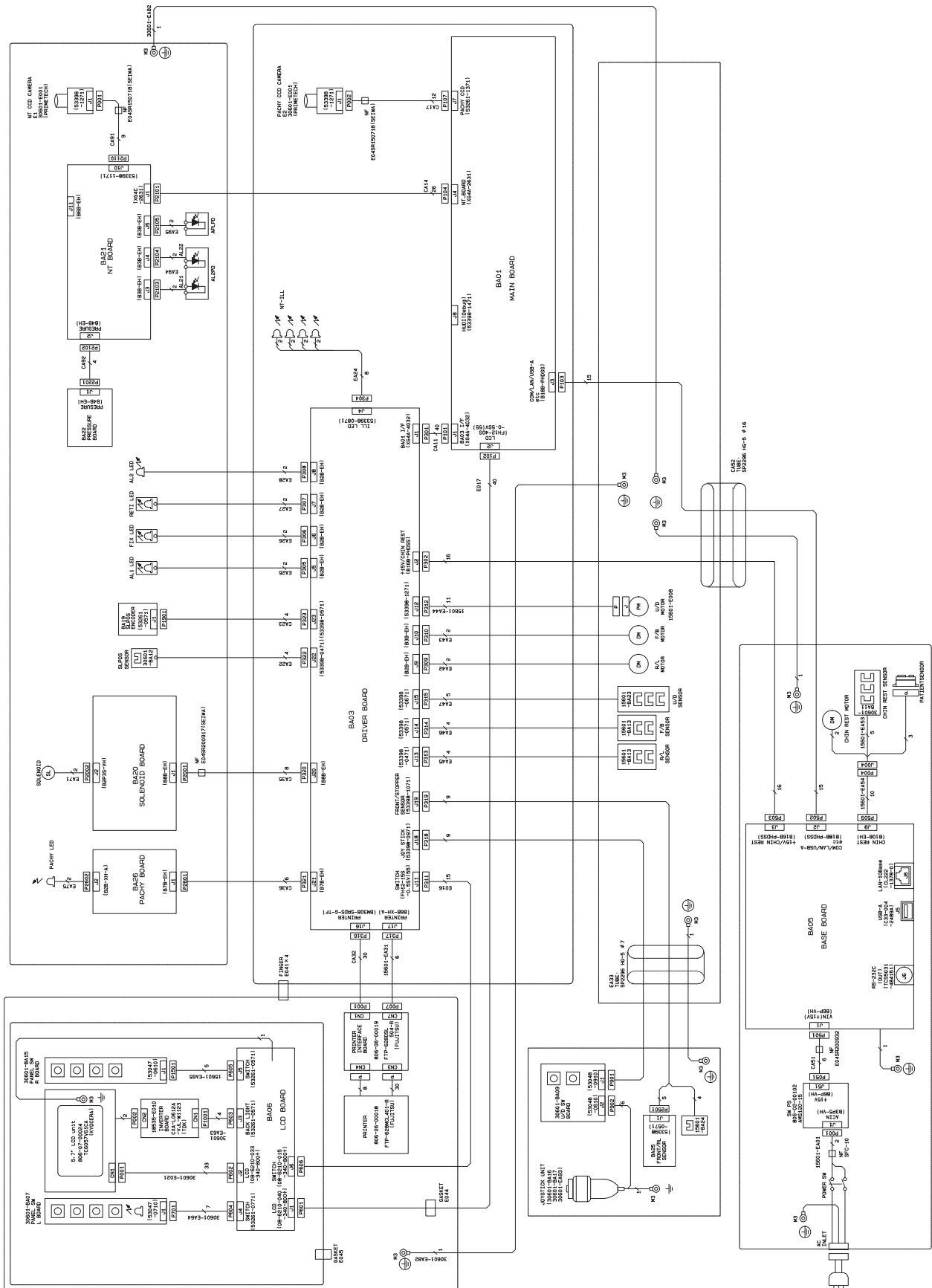
9.3.1 NT-510



9.3.2 NT-530

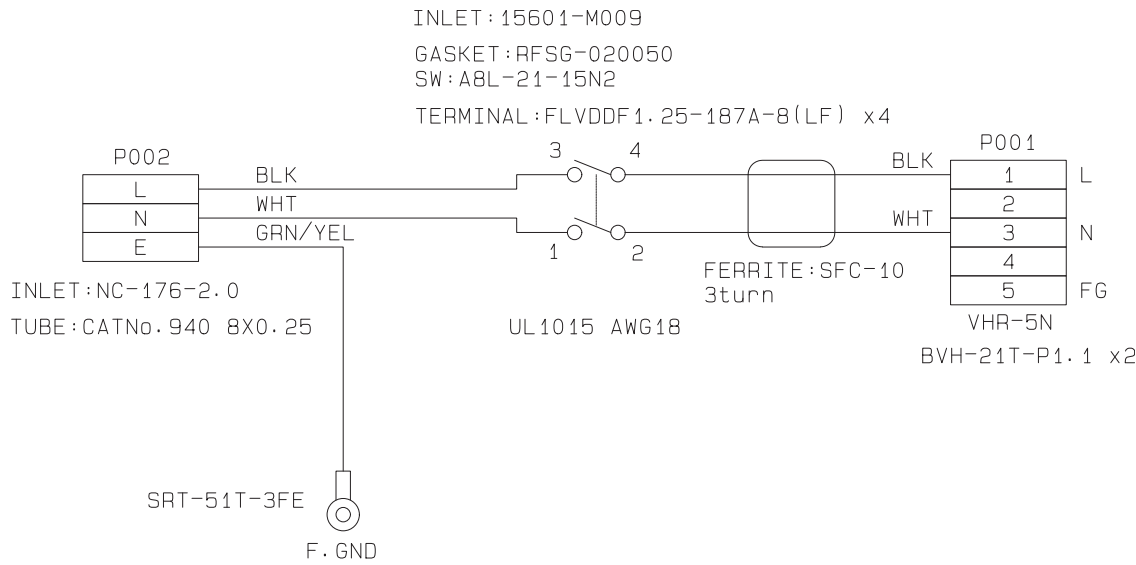


9.3.3 NT-530P



9.4 Connector Cable

15601-EA01



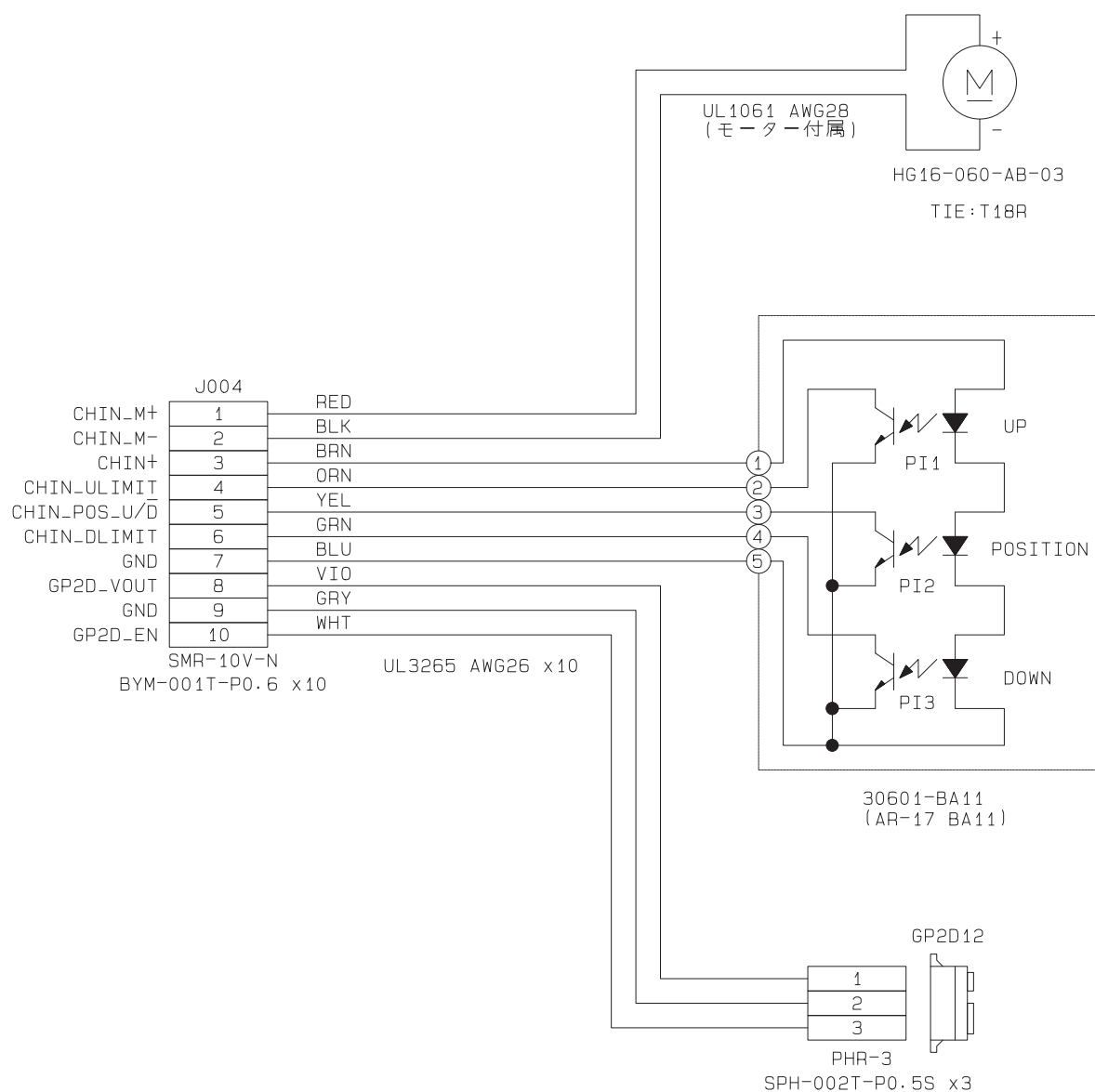
15601-EA31



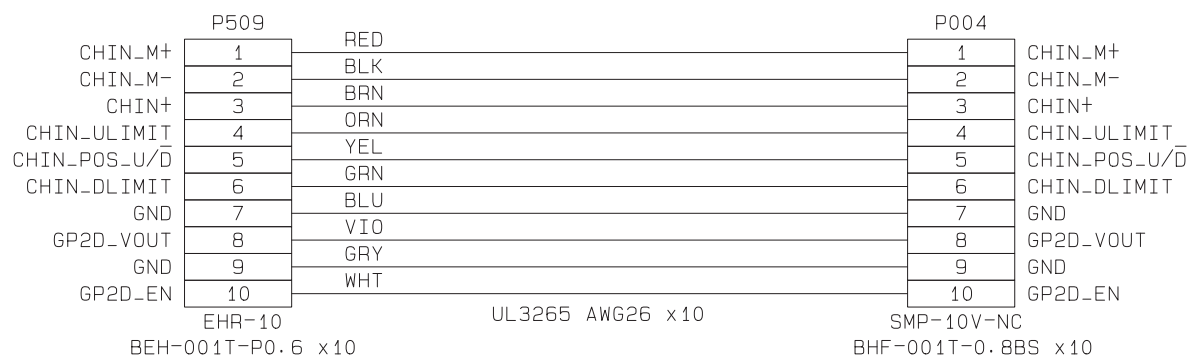
15601-EA44

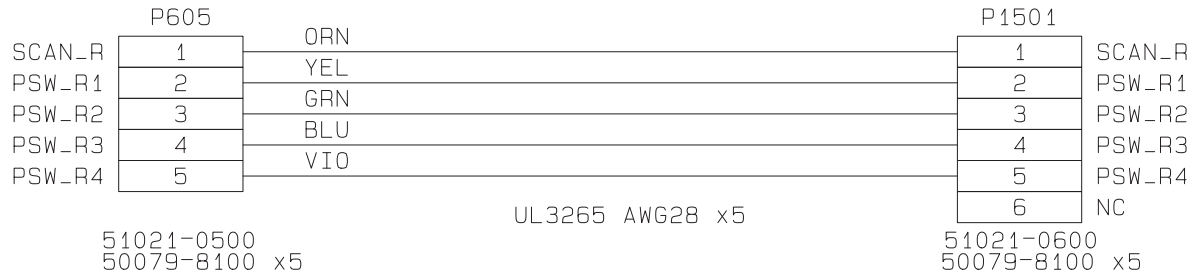
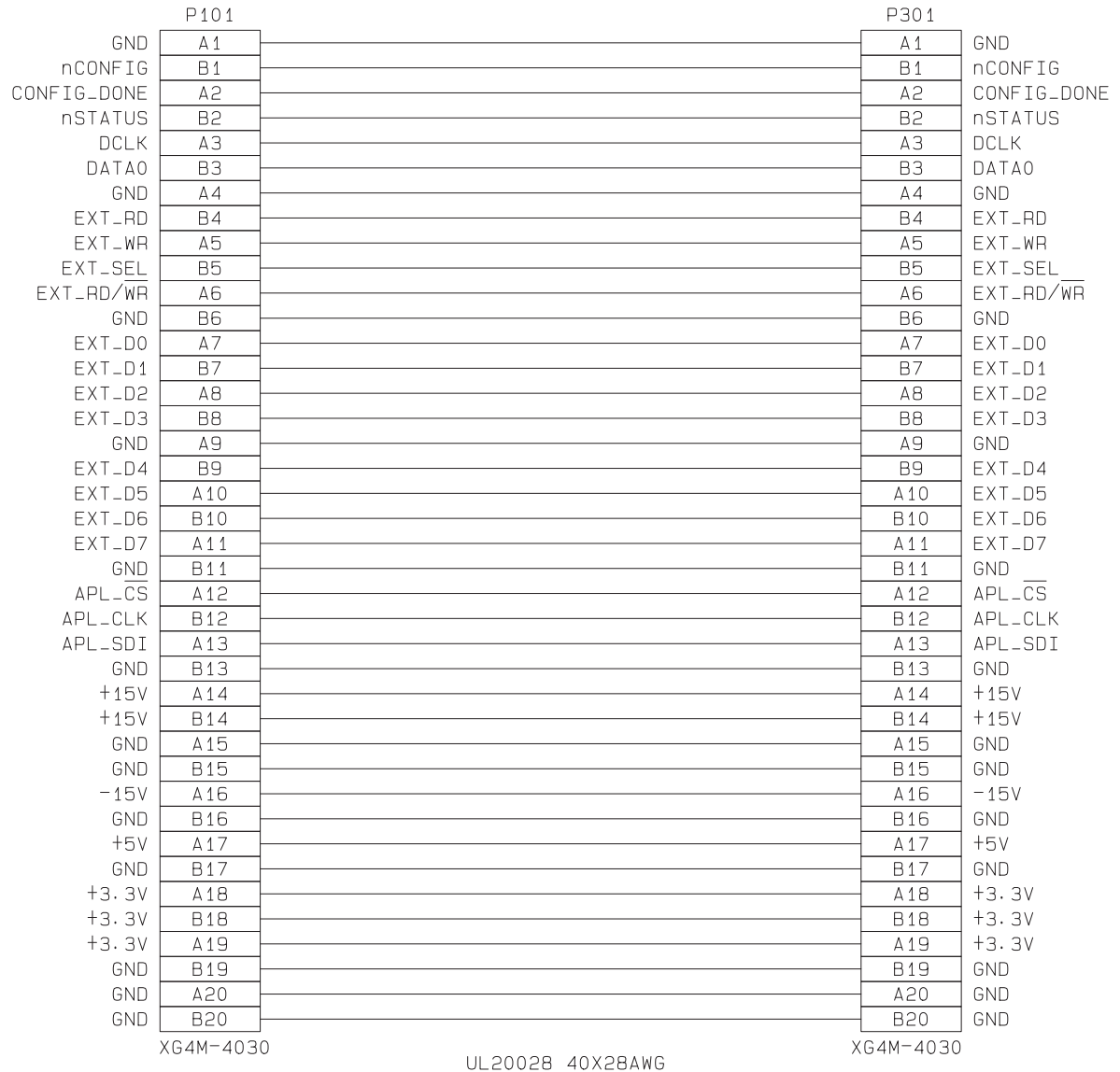


15601-EA53



15601-EA54

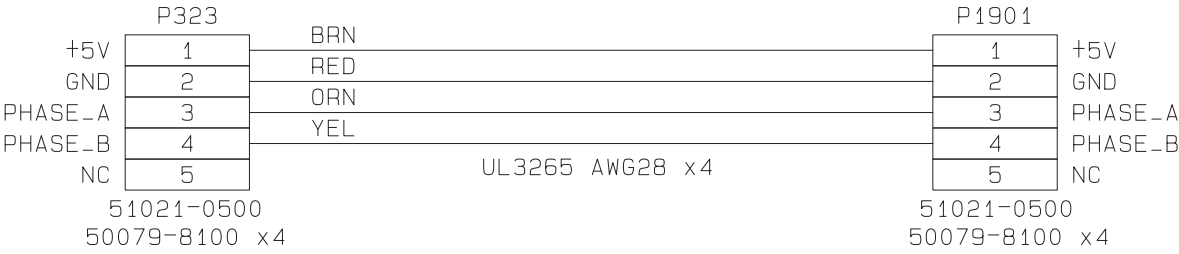


15601-EA65**18536-CA11**

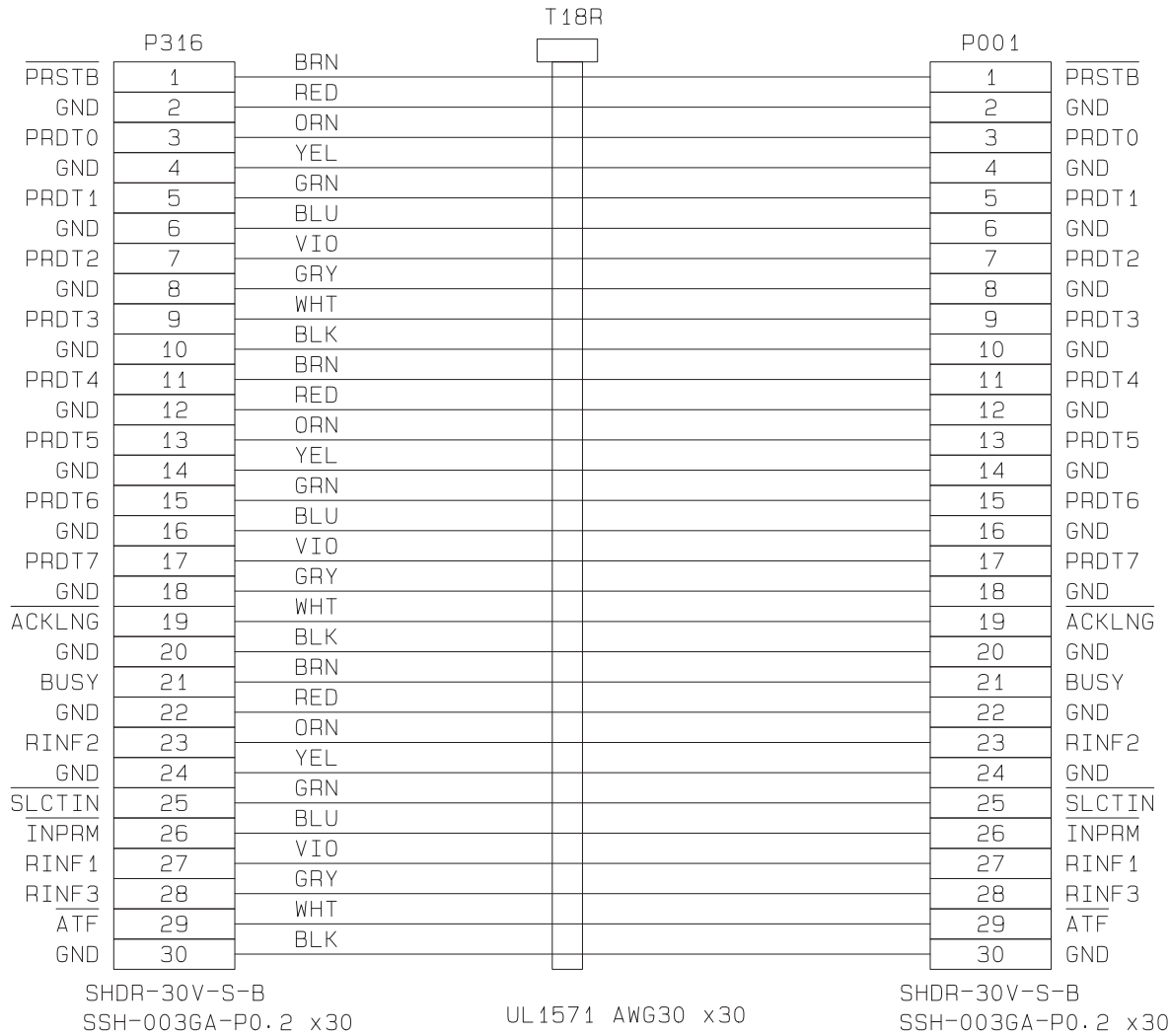
18536-CA14



18536-CA23



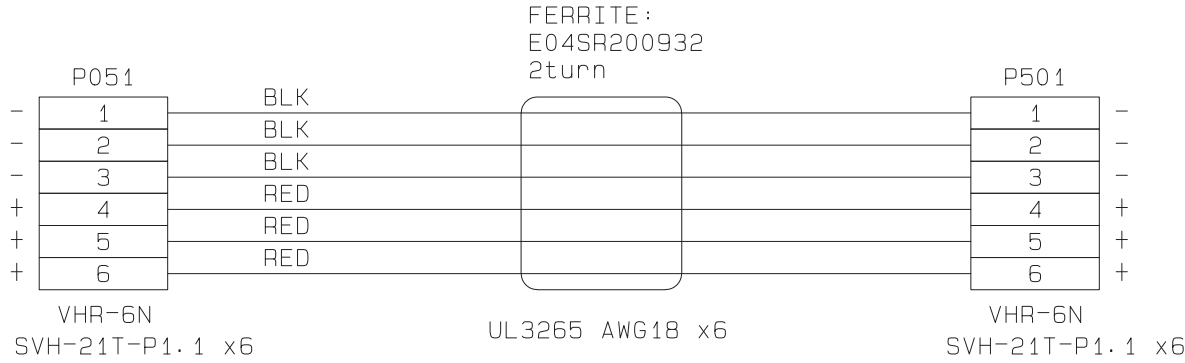
18536-CA32



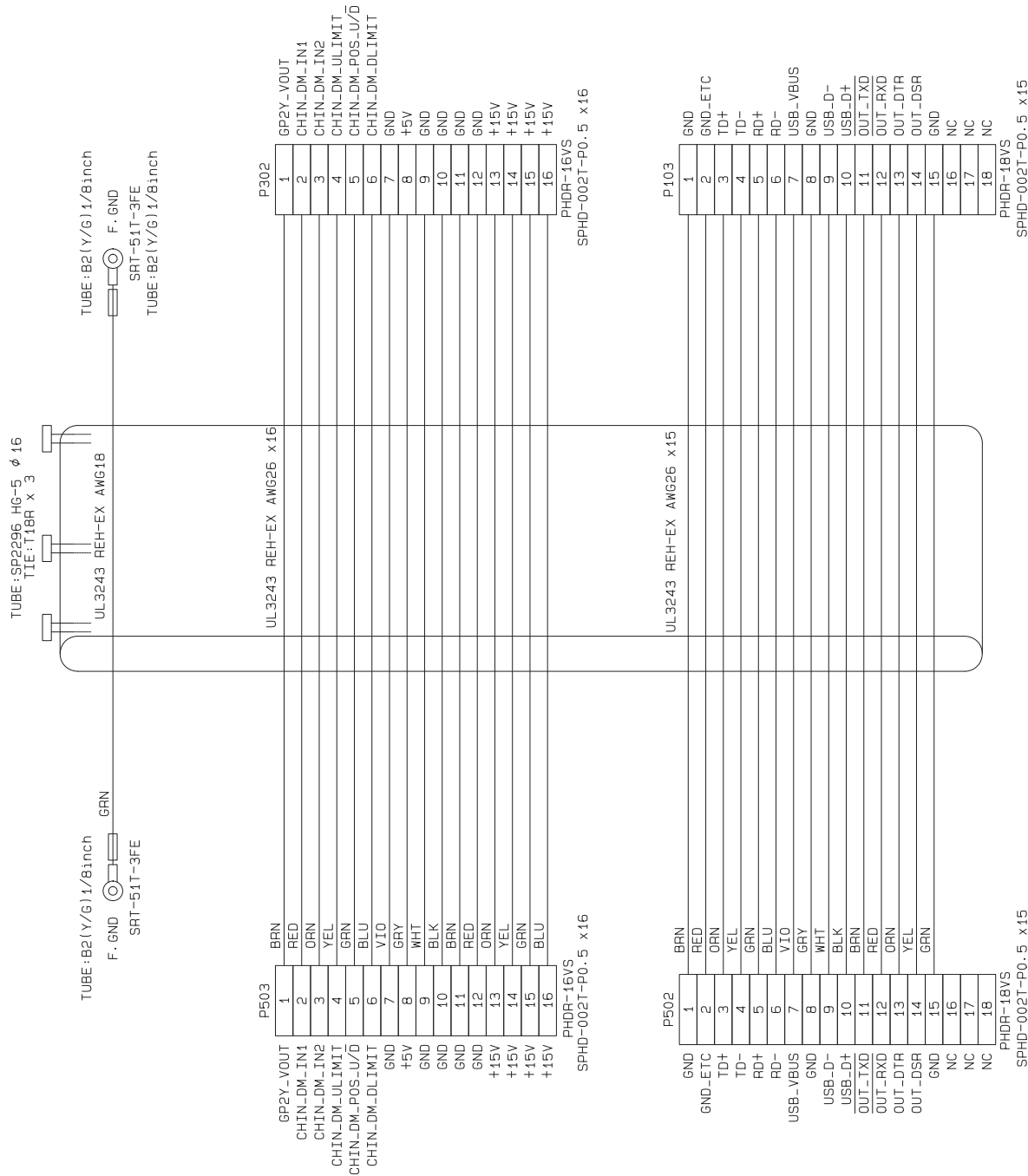
18536-CA35



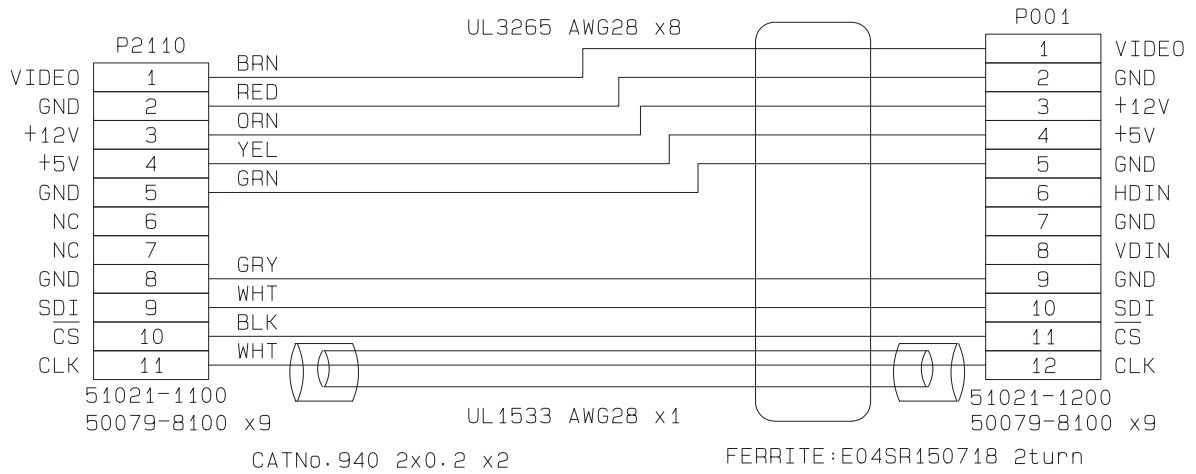
18536-CA51



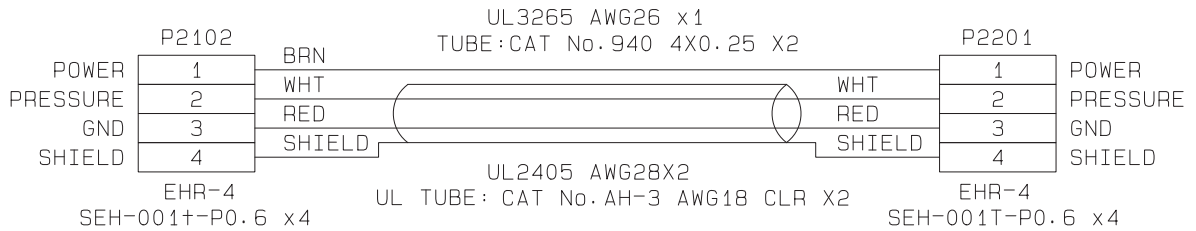
18536-CA52



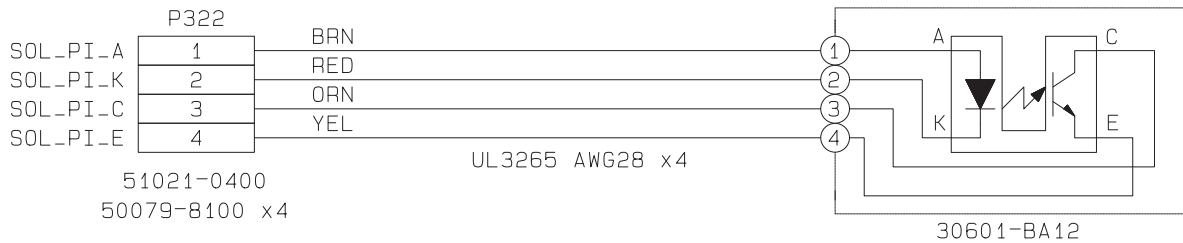
18536-CA91



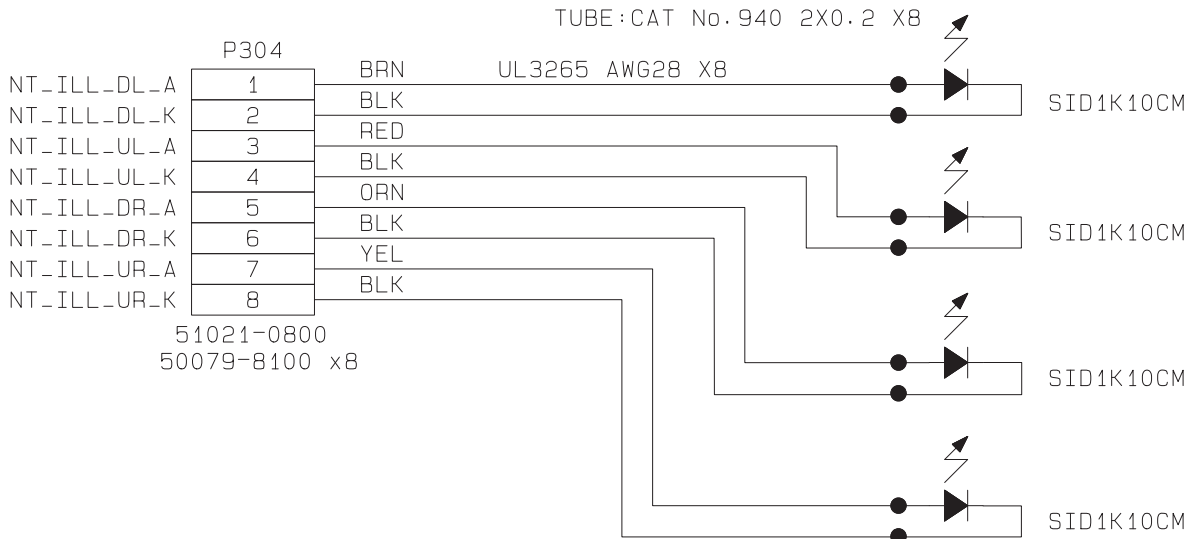
18536-CA92



18536-EA22



18536-EA24



18536-EA25



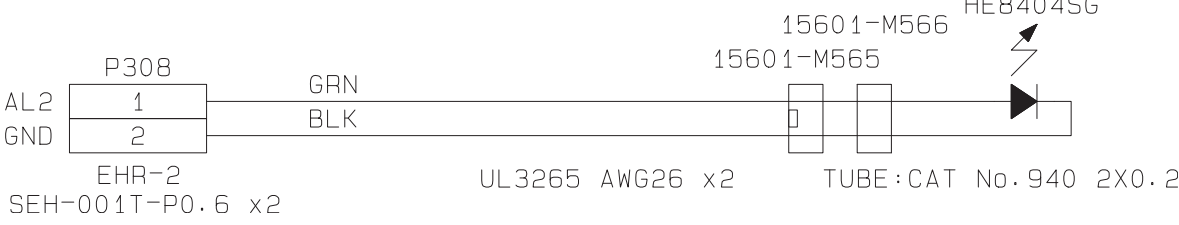
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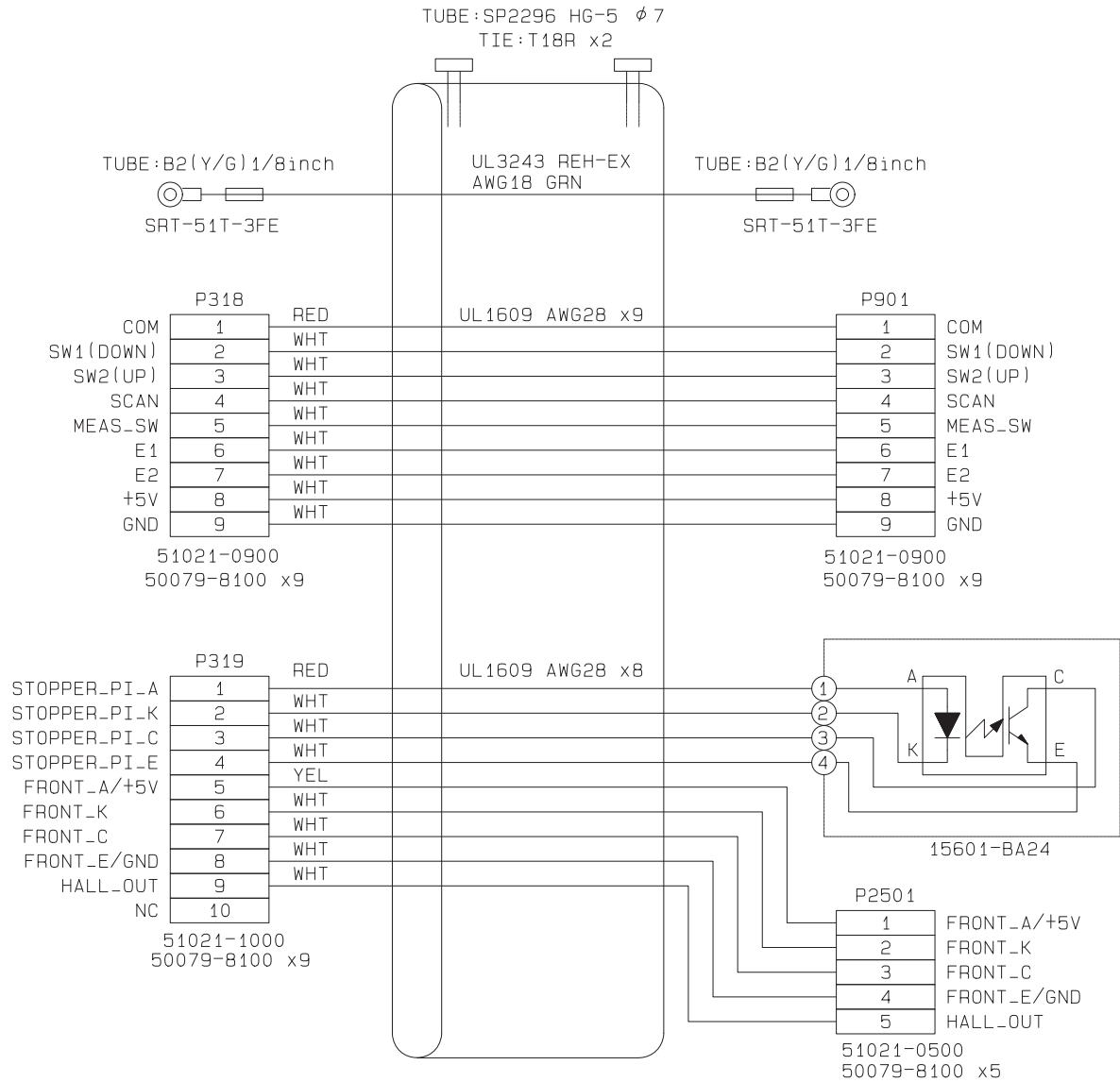
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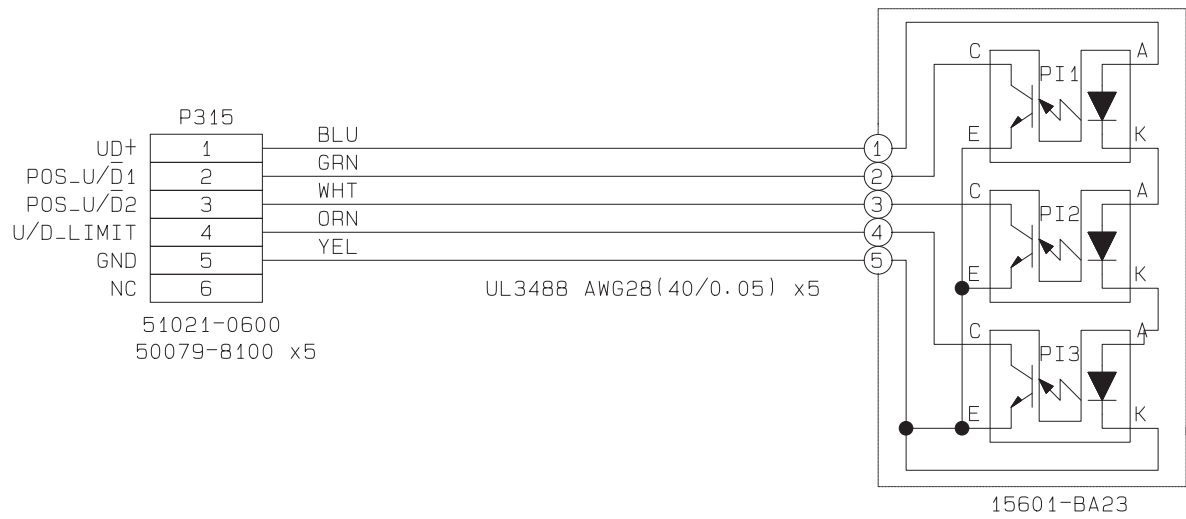
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18536-EA33



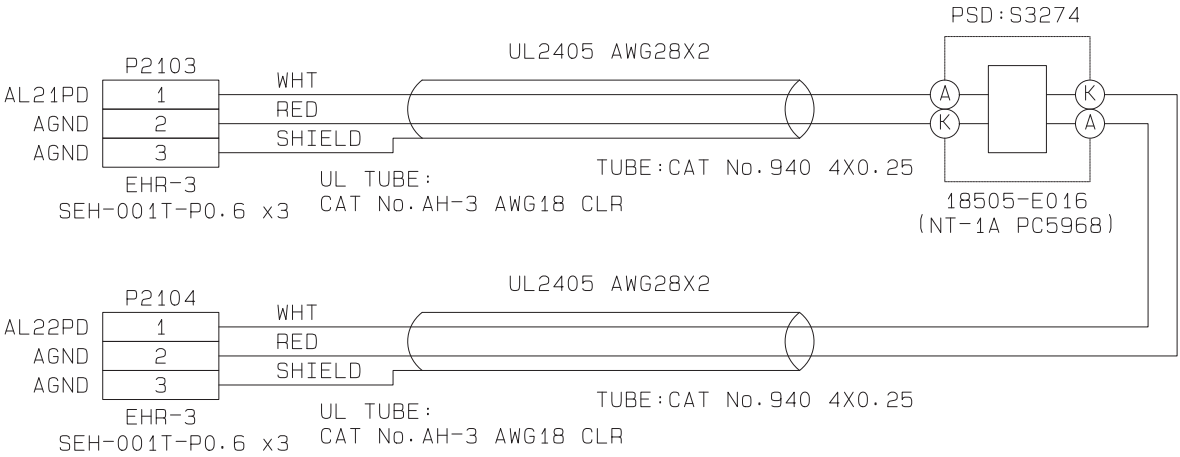
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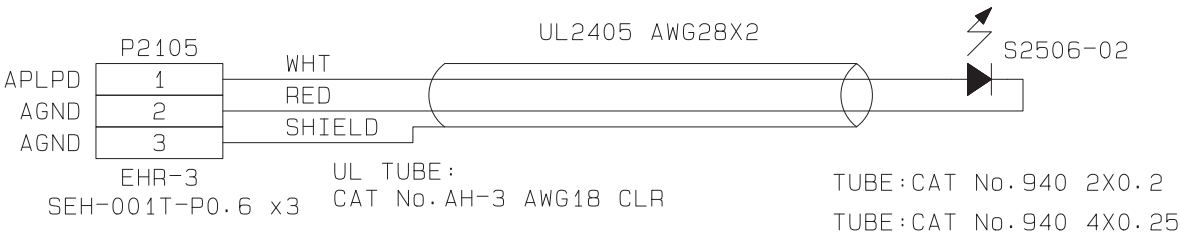
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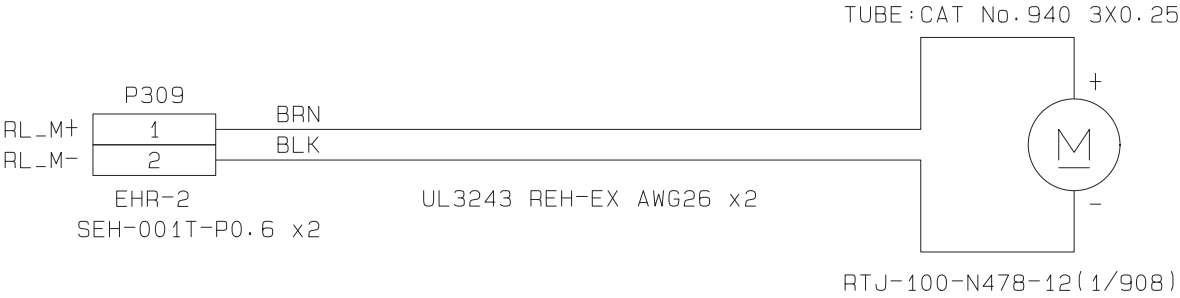
18536-EA94



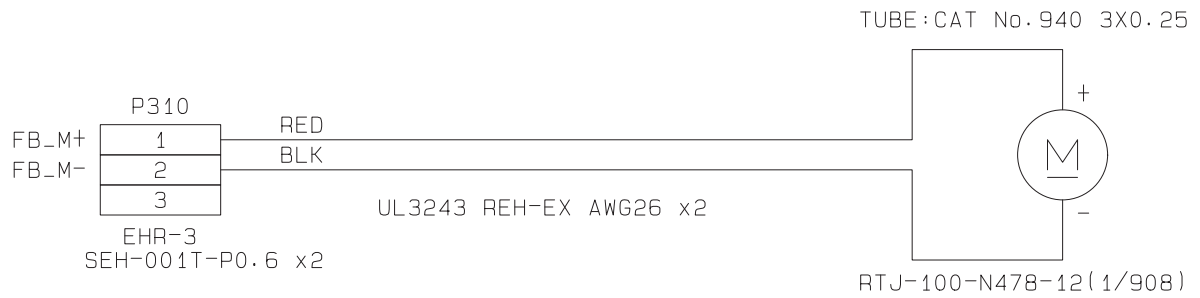
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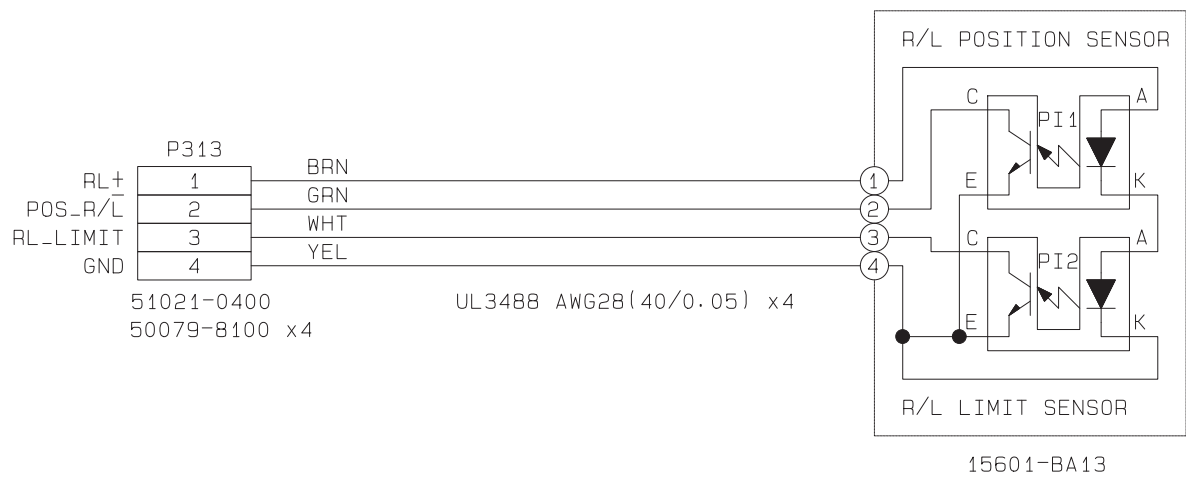
18537-EA42



18537-EA43



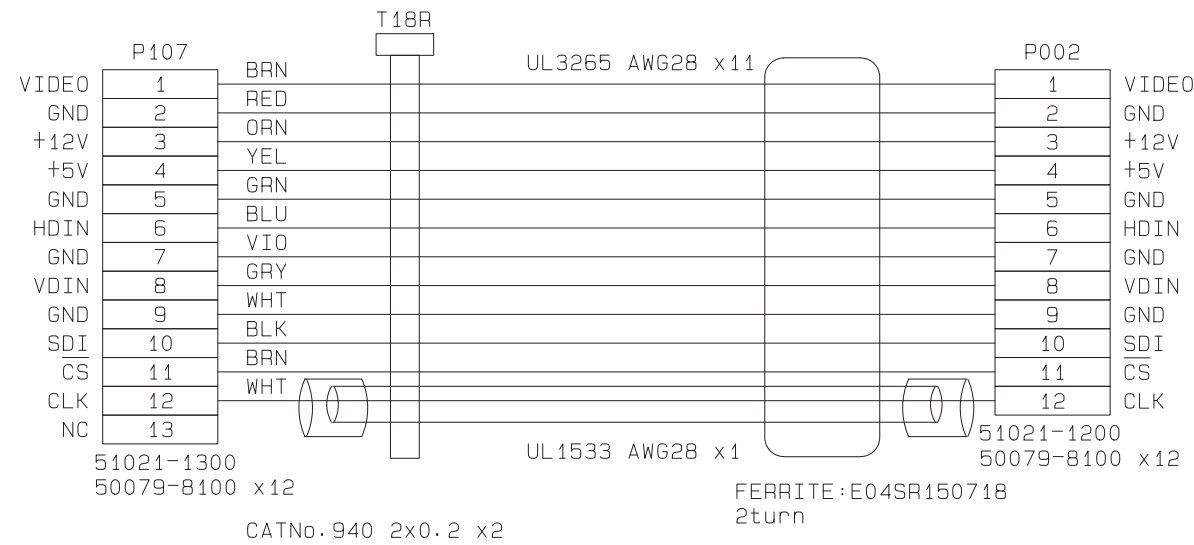
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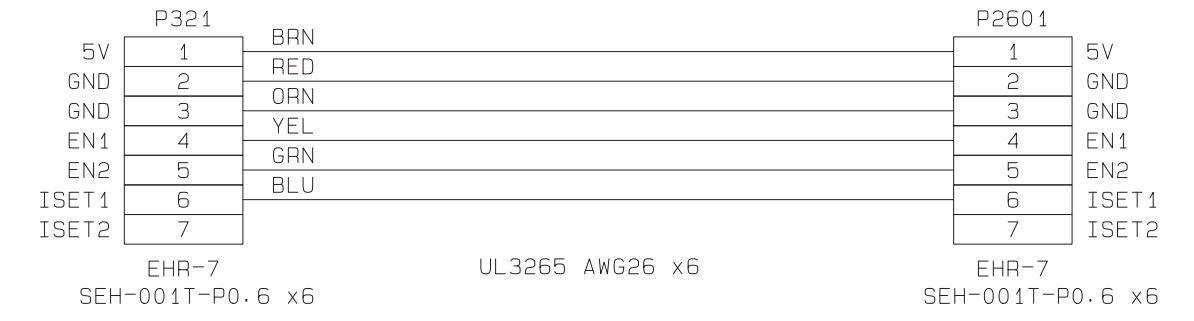
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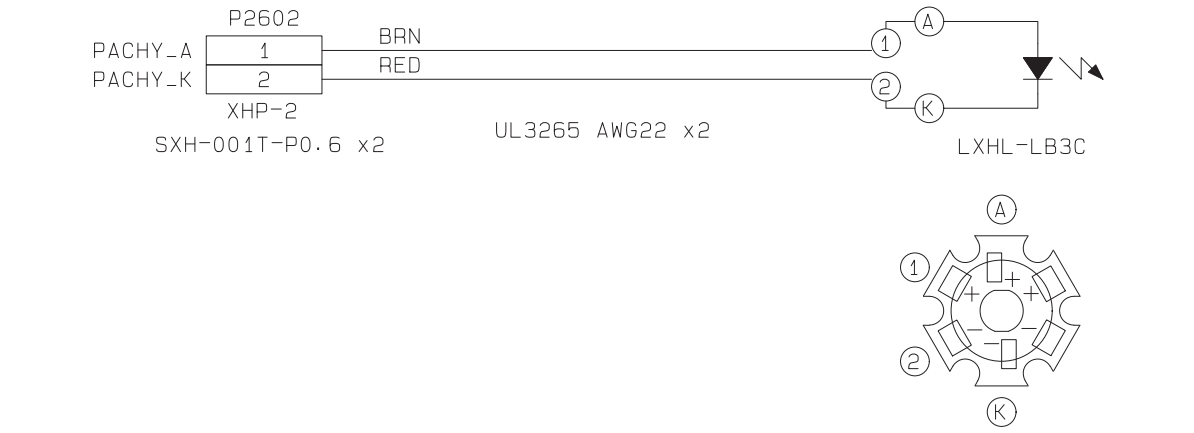
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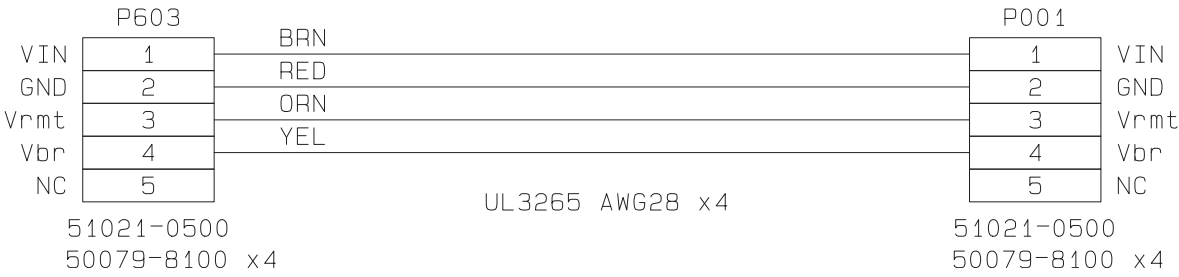
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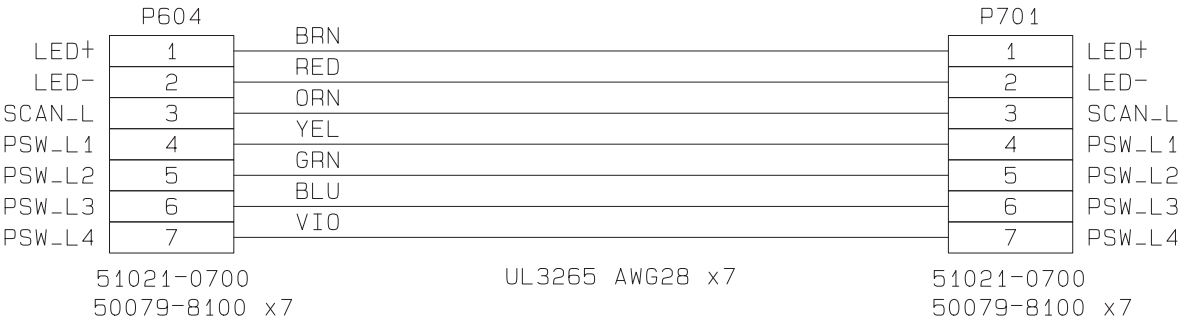
18538-EA75



30601-EA63



30601-EA64



9.5 Error Message List

Error code	Display	Contents	Details
1	ERR001	EEPROM error	EEPROM data failure
2	ERR002	Date and time setting error	Date and time IC data failure
11	ERR011	Character time-out error (OUT)	Data receiving is interrupted.
12	ERR012	Reception start time-out (OUT)	Time-out after DTR/DSR establishment
13	ERR013	Reception error (OUT)	Parity, framing error
14	ERR014	Reception code error (OUT)	Reception code is abnormal.
15	ERR015	Reply time-out (OUT)	Transmission-reception time out error
16	ERR016	DTR-DSR error (OUT)	DTR-DSR time out
17	ERR017	Data error (OUT)	Data error (Improper reception data)
18	ERR018	Command error (OUT)	Command error (Improper command)
19	NO DAT	Data empty (OUT)	No measurement data
31	ERR031	Up/down tracking error	Up/down tracking time-out
32	ERR032	Right/left tracking error	Right/left tracking time-out
33	ERR033	Forward/backward tracking error	Forward/backward tracking time-out
34	ERR034	Chinrest up/down movement error	Chinrest up/down movement time-out
41	NO PAPER	No printer paper error	There is no printer paper or the printer head is raised.
44	ERR044	Printer hardware error	Printer failure
72	ERR072	Model code mismatch error	Board for NT-510/NT-530 is attached.
73	ERR073	Model code mismatch error	BA03 board for NT-530P and BA01 board for NT-510/NT-530 are attached.
74	ERR074	Model code mismatch error	BA01 board for NT-530P and BA03 board for NT-510/NT-530 are attached.
75	ERR075	BA03 model code error	BA03 board of NT-510/NT-530 was replaced.
76	ERR076	BA03 model code error	BA03 board of NT-530P was replaced.
77	ERR077	BA01 model code error	BA01P board of NT-510/NT-530 was replaced.
78	ERR078	BA01 model code error	BA01 board of NT-530P was replaced.
201	ERR201	Piston error	Piston lock or solenoid position sensor failure
202	ERR202	Charging error	Charging failure
601	ERR601	USB_A class error	USB host class failure
602	ERR602	USB_A recognition error	USB host recognition failure
700	ERR700	File sharing error	Windows file sharing error
703	ERR703	Hardware error	IC error
704	ERR704	DHCP error	The IP address cannot be obtained.
750	ERR750	Network access error	The network cannot be accessed.
751	ERR751	Network writing error	Writing to PC is not possible.
754	ERR754	PC name error	The specified name of the PC does not exist.
755	ERR755	Read-only folder error	The folder in the destination PC has read-only attribute.
756	ERR756	Log on error	Logging on to the PC is not allowed. (User name or password is not correct.)
757	ERR757	Shared folder error	The shared folder does not exist. (The name of the shared folder is incorrect.)
758	ERR758	Time-out error	Time-out (The PC does not finish the process within the time frame.)
759	ERR759	Deletion error	The PC data cannot be deleted.

Error code	Display	Contents	Details
760	ERR760	Initialization error	During initialization of network (It takes awhile after the PC starts.)
761	ERR761	Access right error	The access to the shared folder is not allowed.
762	ERR762	Account error	The account is invalid. (User setting is improper.)
763	ERR763	Read error	File reading error
771	ERR771	Cable connection error	The LAN cable is not connected.
772	ERR772	ACK error	No response from the PC

9.6 Parameter List

9.6.1 NT-510

NT-510			Outside Japan	INC	China
NT	01	SET LOW CONF	NO	NO	NO
	02	LOW CONF LV.	NO	NO	NO
	03	LOW CONF ALARM	NO	NO	NO
	04	FIX LED BLINK	YES	YES	YES
	05	NT CONTINUE	3	3	3
	06	DECIMAL DIGIT	YES	YES	YES
	07	MEAS INTERBAL	NORMAL	NORMAL	NORMAL
PRINT1	11	PRINT	MANUAL	MANUAL	MANUAL
	12	ECONO?PRINT PRINT	NO	NO	NO
	13	PRINT&CLEAR	NO	NO	NO
	14	PRINT DENCITY	MIDDLE	MIDDLE	MIDDLE
	15	PATIENT NO.	YES	YES	YES
	16	SET PATIENT NO.	0001	0001	0001
	17	NAME PRINT	YES	YES	YES
	18	DATE FORMAT	M/D/Y	M/D/Y	M/D/Y
	19	PRINT COMMENT	YES	YES	YES
	20	NT PRINT	V	V	V
FUNCTION1	21	PRESSURE CHECK	NO	NO	NO
	22	TRACKING SW	TRC/ASHOT	TRC/ASHOT	TRC/ASHOT
	23	ASHOT TIMING	NORMAL	NORMAL	NORMAL
	24	SLEEP	5MIN	5MIN	5MIN
	25	BEEP	LOW	LOW	LOW
	26	NT BRIGHTNESS	NORMAL	NORMAL	NORMAL
	27	ICON OFF	NO	NO	NO
	28	TARGET TYPE	RKT	RKT	RKT
	29	TOO CLOSE BEEP	NO	NO	NO
COMMUNICATION	31	I/F MODE	NIDEK	NIDEK	NIDEK
	32	I/F FORMAT	ALL	ALL	ALL
	33	BAUD-RATE	9600	9600	9600
	34	BIT LENGTH	8	8	8
	35	CR CODE	NO	NO	NO
READER	41	READER START	1	1	1
	42	READER LENGTH	14	14	14
NETWORK	51	NETWORK	NO	NO	NO
	52	DHCP	NO	NO	NO
	53	IP	192.168.0.40		
	54	MASK	255.255.255.0		
	55	USER	GUEST		
	56	PASSWORD	-		
	57	DOMAIN	WORKGROUP		
	58	MACHINE	PC		
	59	FOLDER	DATA		
	60	IMAGE SEND	NO		
CLOCK SET	CLOCK MODE		-	-	-
COMMENT SET	COMMENT SET		NIDEK NT-510		

9.6.2 NT-530

NT-530			Outside Japan	INC	China
NT	01	SET LOW CONF	NO	NO	NO
	02	LOW CONF LV.	NO	NO	NO
	03	LOW CONF ALARM	NO	NO	NO
	04	FIX LED BLINK	YES	YES	YES
	05	NT CONTINUE	3	3	3
	06	DECIMAL DIGIT	YES	YES	YES
	07	MEAS INTERBAL	NORMAL	NORMAL	NORMAL
	08	AI MODE	YES	YES	YES
	09	DELETE SELECT	* DATA	* DATA	* DATA
PRINT1	11	PRINT	MANUAL	MANUAL	MANUAL
	12	ECONO?PRINT PRINT	NO	NO	NO
	13	PRINT&CLEAR	NO	NO	NO
	14	PRINT DENSITY	MIDDLE	MIDDLE	MIDDLE
	15	PATIENT NO.	YES	YES	YES
	16	SET PATIENT NO.	0001	0001	0001
	17	NAME PRINT	YES	YES	YES
	18	DATE FORMAT	M/D/Y	M/D/Y	M/D/Y
	19	PRINT COMMENT	YES	YES	YES
	20	NT PRINT	V	V	V
FUNCTION1	21	PRESSURE CHECK	NO	NO	NO
	22	TRACKING SW	TRC/ASHT	TRC/ASHT	TRC/ASHT
	23	ASHT TIMING	NORMAL	NORMAL	NORMAL
	24	SLEEP	5MIN	5MIN	5MIN
	25	BEEP	LOW	LOW	LOW
	26	NT BRIGHTNESS	NORMAL	NORMAL	NORMAL
	27	ICON OFF	NO	NO	NO
	28	TARGET TYPE	RKT	RKT	RKT
	29	TOO CLOSE BEEP	NO	NO	NO
COMMUNICATION	31	I/F MODE	NIDEK	NIDEK	NIDEK
	32	I/F FORMAT	ALL	ALL	ALL
	33	BAUD-RATE	9600	9600	9600
	34	BIT LENGTH	8	8	8
	35	CR CODE	NO	NO	NO
READER	41	READER START	1	1	1
	42	READER LENGTH	14	14	14
NETWORK	51	NETWORK	NO	NO	NO
	52	DHCP	NO	NO	NO
	53	IP	192.168.0.40		
	54	MASK	255.255.255.0		
	55	USER	GUEST		
	56	PASSWORD	-		
	57	DOMAIN	WORKGROUP		
	58	MACHINE	PC		
	59	FOLDER	DATA		
	60	IMAGE SEND	NO		
IOP CORRECT	61	CORRECTED IOP	NO	NO	NO
	62	SET PARAMETER	-	-	-
CLOCK SET		CLOCK MODE	-	-	-
COMMENT SET		COMMENT SET	NIDEK NT-530		

9.6.3 NT-530P

	NT-530P		Outside Japan	INC	China
NT	01	SET LOW CONF	NO	NO	NO
	02	LOW CONF LV.	NO	NO	NO
	03	LOW CONF ALARM	NO	NO	NO
	04	FIX LED BLINK	YES	YES	YES
	05	NT CONTINUE	3	3	3
	06	DECIMAL DIGIT	YES	YES	YES
	07	MEAS INTERBAL	NORMAL	NORMAL	NORMAL
	08	AI MODE	YES	YES	YES
	09	DELETE SELECT	* DATA	* DATA	* DATA
PACKY	11	PACKY CONTINUE	3	3	3
	12	PACKY LOW CONF	NO	NO	NO
	13	THUMBNAIL	YES	YES	YES
PRINT1	21	PRINT	MANUAL	MANUAL	MANUAL
	22	ECONO. PRINT	NO	NO	NO
	23	PRINT&CLEAR	NO	NO	NO
	24	PRINT DENCITY	MIDDLE	MIDDLE	MIDDLE
	25	PATIENT NO.	YES	YES	YES
	26	SET PATIENT NO.	0001	0001	0001
	27	NAME PRINT	YES	YES	YES
	28	DATE FORMAT	M/D/Y	M/D/Y	M/D/Y
	29	PRINT COMMENT	YES	YES	YES
	20	NT PRINT	V	V	V
FUNCTION1	31	PRESSURE CHECK	NO	NO	NO
	32	TRACKING SW	TRC/ASHOT	TRC/ASHOT	TRC/ASHOT
	33	ASHOT TIMING	NORMAL	NORMAL	NORMAL
	34	SLEEP	5MIN	5MIN	5MIN
	35	BEEP	LOW	LOW	LOW
	36	NT BRIGHTNESS	NORMAL	NORMAL	NORMAL
	37	ICON OFF	NO	NO	NO
	38	TARGET TYPE	RKT	RKT	RKT
	39	TOO CLOSE BEEP	NO	NO	NO
	40	NT/PACHY CUT	NO	NO	NO
COMMUNICATION	41	I/F MODE	NIDEK	NIDEK	NIDEK
	42	I/F FORMAT	ALL	ALL	ALL
	34	BAUD-RATE	9600	9600	9600
	44	BIT LENGTH	8	8	8
	45	CR CODE	NO	NO	NO
READER	51	READER START	1	1	1
	52	READER LENGTH	14	14	14

NT-530P			Outside Japan	INC	China
NETWORK	61	NETWORK	NO	NO	NO
	62	DHCP	NO	NO	NO
	63	IP	192.168.040		
	64	MASK	255.255.255.0		
	65	USER	GUEST		
	66	PASSWORD	-		
	67	DOMAIN	WORKGROUP		
	68	MACHINE	PC		
	69	FOLDER	DATA		
	70	IMAGE SEND	NO		
IOP CORRECT	71	CORRECTED IOP	NO	NO	NO
	72	SET PARAMETER	-	-	-
CLOCK SET		CLOCK MODE	-	-	-
COMMENT SET		COMMENT SET	NIDEK NT-530P		

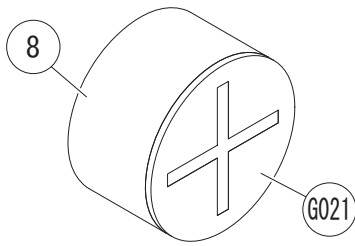
9.7 Jigs

9.7.1 Jig list

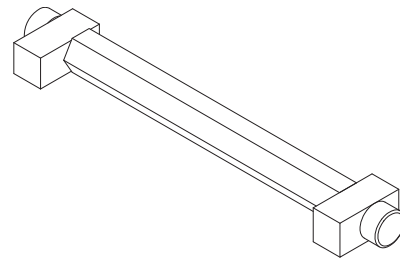
Part No.	Part name
18503-G021	IR sensor sticker
18503-M008	Sensor board
18504-1600	Distance alignment rod
18504-1700	Intensity adjustment jig
18504-8000	Alignment 2 check jig
18504-G007	Reticle plate
18512-0111	Single calibration model eye (medium pressure, with calibration certificate)
18512-0110	Single calibration model eye (medium pressure)
18512-0121	Single calibration model eye (low pressure, with calibration certificate)
18512-0120	Single calibration pressure model eye (low pressure)
18512-0131	Single calibration model eye (high pressure, with calibration certificate)
18512-0130	Single calibration model eye (high pressure)
18512-0211	Triple calibration model eye (with calibration certificate)
18512-0210	Triple calibration model eye
18512-0310	Electric model eye
18570-1100	
18530-G002	Artificial eye B
18541-1001	Distance alignment jig
18541-1017	Single calibration spherical model eye holder
18541-1019	NT-4 optical adjustment jig
32107-1100	Chinrest attachment jig
32107-2100	Chinrest attachment joint
32961-0700	Model eyes (CL)
18570-2100	Pachy phototransmitter adjustment jig
18570-2300	NT-5P optical adjustment jig
18570-2400	Distance alignment jig
18570-2900	Pachy calibration set Pachy calibration jig (18570-2500) Filter jig (18541-1034) Storage case (18541-1050)
18570-2600	Pachy adjustment model eye holder

9.7.2 Details

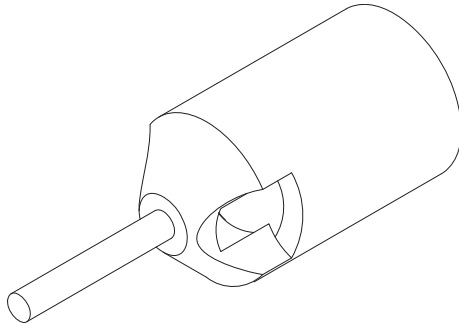
IR sensor sticker (18503-G021)
Sensor board (18503-M008)



Distance alignment rod (18504-1600)

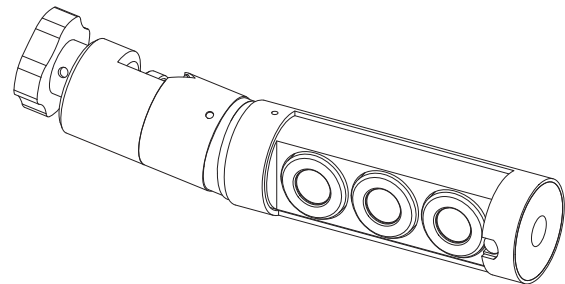


Alignment 2 check jig (18504-8000)



Triple calibration model eye (with calibration certificate)
(18512-0211)

Triple calibration model eye (18512-0210)



Single calibration model eye (medium pressure, with
calibration certificate [18512-0111])

Single calibration model eye (medium pressure [18512-
0110])

Single calibration model eye (low pressure, with calibration
certificate [18512-0121])

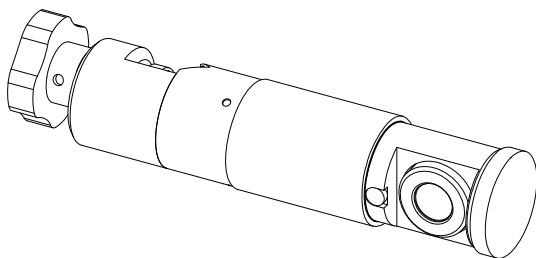
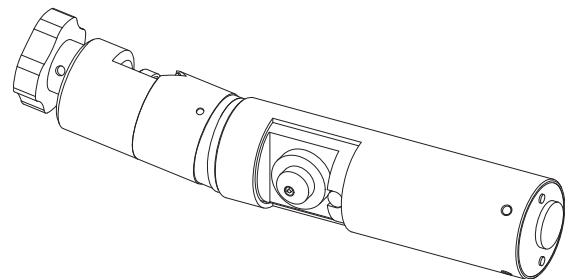
Single calibration model eye (low pressure [18512-0120])

Single calibration model eye (high pressure, with calibration
certificate [18512-0131])

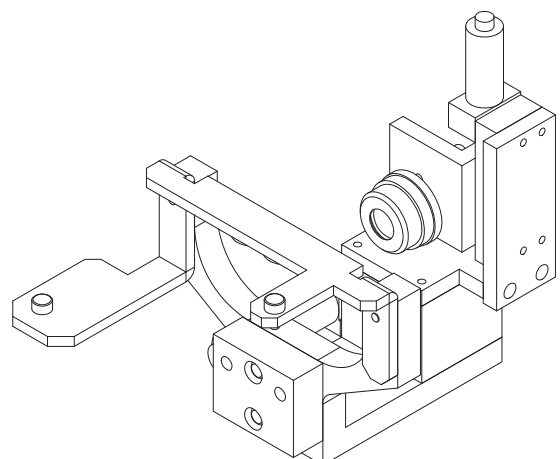
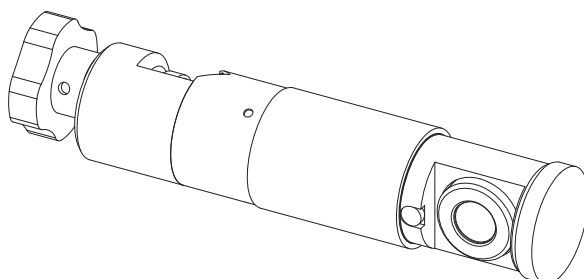
Single calibration model eye (high pressure [18512-0130])

Electric model eye (18512-0310)

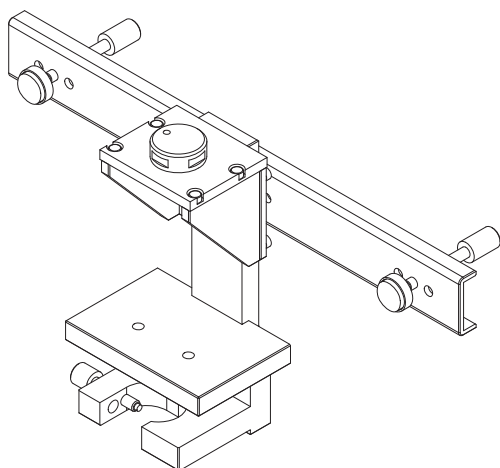
Electric model eye (18570-1100)



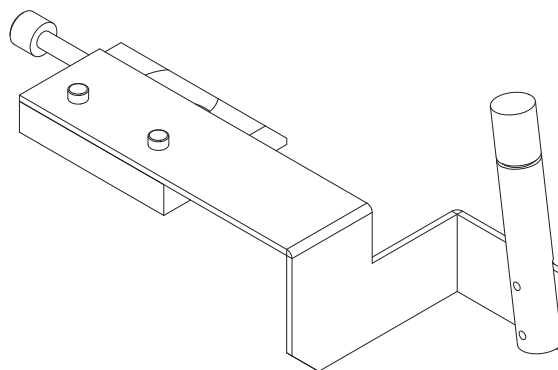
Single calibration spherical model eye holder (18541-1017) NT-4 optical adjustment jig (18541-1019)



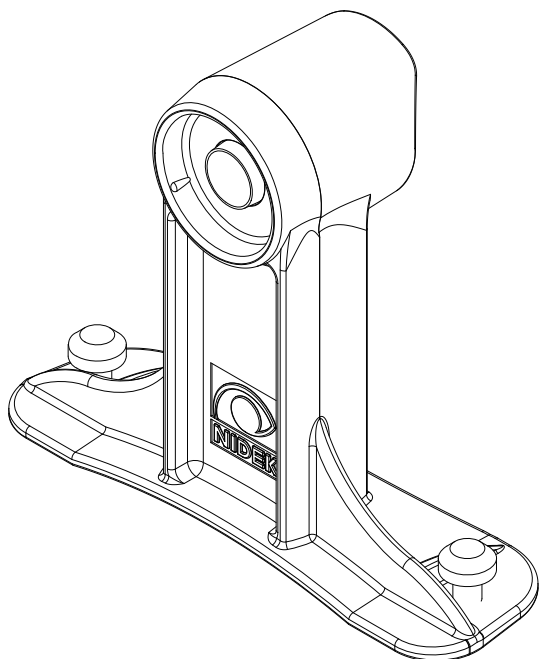
Chinrest attachment jig (32107-1100)



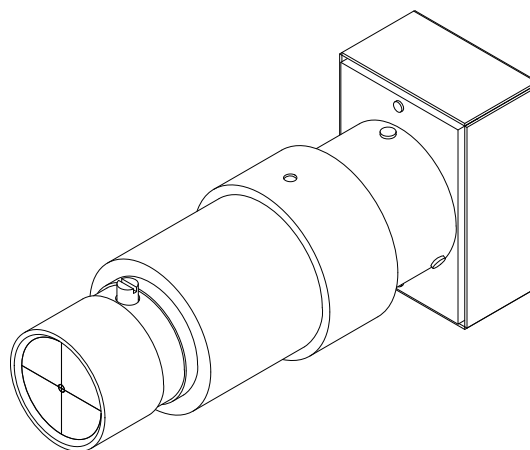
Chinrest attachment joint (32107-2100)



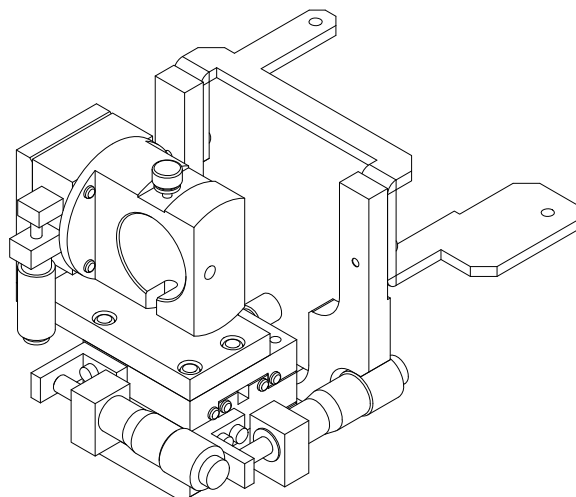
Model eye (CL) (32961-0700)



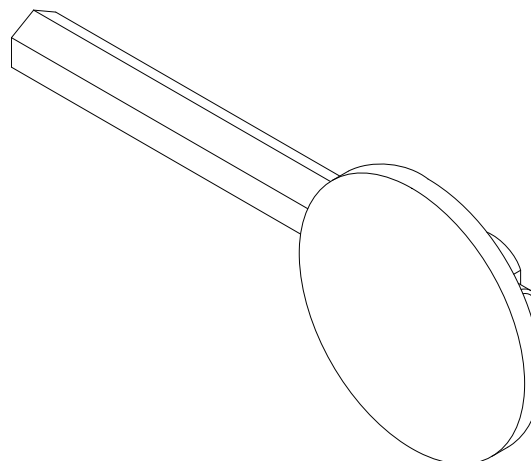
Pachy phototransmitter adjustment jig (18570-2100)



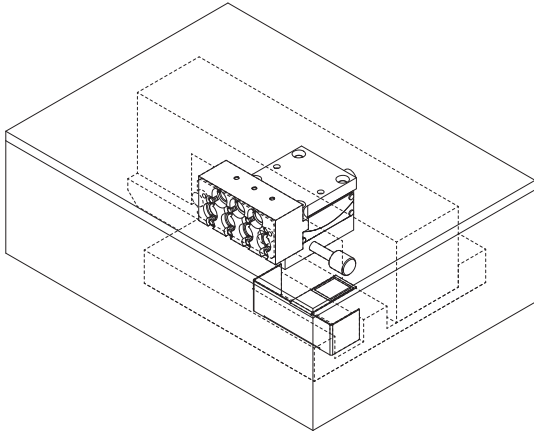
NT-5P optical adjustment jig (18570-2300)



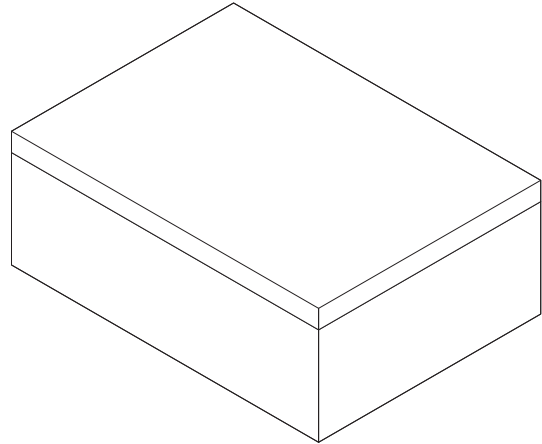
Distance alignment jig (18570-2400)



Pachy calibration set (18570-2900)

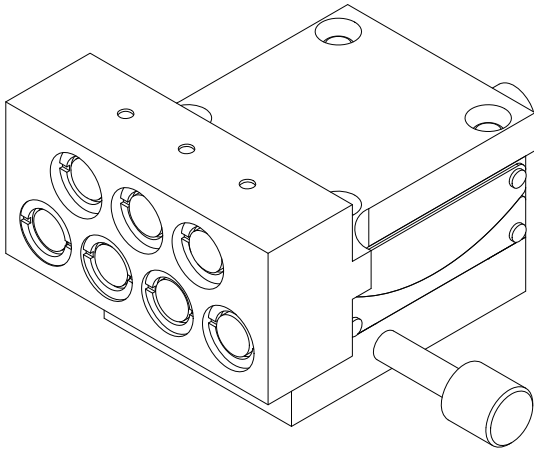


Storage case (18541-1050)

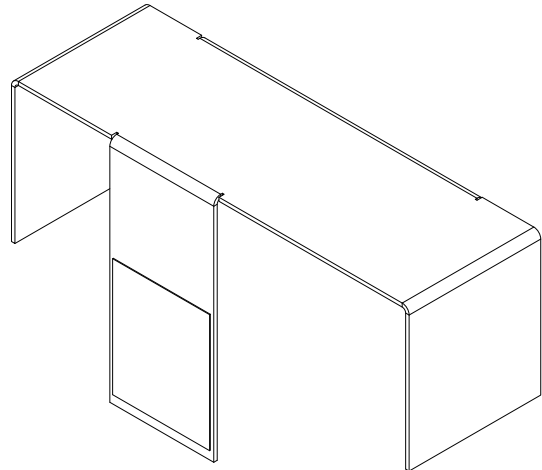


A pachy calibration set consists of a storage case (18541-1050), a filter jig (18541-1034), and a pachy calibration jig (18570-2500).

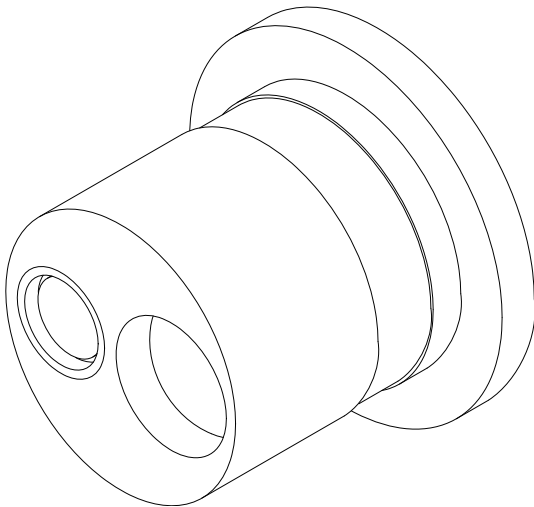
Pachy calibration jig (18570-2500)



Filter jig (18541-1034)



Pachy adjustment model eye holder (18570-2600)



9.8 Adjustment Item List

9.8.1 ASSYs and adjustment items

Replacement part	7.1.13 Pachy photodetector ASSY (18538-3200) (p91)	7.1.12 Brake ASSY (30601-2300) (p91)	7.1.11 Joystick ASSY (30601-2600) (p90)	7.1.10 Chinrest ASSY (15601-1500) (p90)	7.1.9 F/B motor ASSY (18537-2520) (p89)	7.1.8 R/L motor ASSY (18537-2510) (p88)	7.1.7 Horizontal tracking ASSY (18537-2500) (p86)	7.1.6.2 NT-530P adjusted NT measuring ASSY (18538-9100) (p85)	7.1.6.1 NT-510/NT-530 adjusted NT measuring ASSY (18538-9100) (p84)	7.1.5 LCD ASSY (18536-6100) (p83)	7.1.4 Piston ASSY (18536-5200) (p83)	7.1.3 Body ASSY (p79)	7.1.2 Inlet ASSY (18536-1100) (p78)	7.1.1 Base ASSY (18536-1000) (p77)	6.4 Measuring Unit Front Cover ASSY (p69)
Adjustment item															
8.1.6 Parameter settings (p125)															
8.3.1 Camera focus (p135)															
8.3.2 Optical reticle position (p136)															
8.3.3 NT camera position (p137)															
8.3.4 AL2 LED optical axis (p138)															
8.3.5 Alignment spot intensity (p139)															
8.3.6 NT board (p141)															
8.3.7 Fixation light position (p143)															
8.3.8 Solenoid brake (p146)											○				
8.3.9 Puffed air pressure (p147)											○				
8.3.10 Reference marker position (p147)															
8.3.12 Focusing indicator check (p150)															
8.3.13 Model eye measurements (p151)											○				
8.3.14 A/B constant (p154)															
8.4.1 Pachy illumination ASSY (p157)															
8.4.2 Pachy photodetector ASSY (p163)															○
8.4.3.1 PARALLELISM ADJUSTMENT (p168)								○							○
8.4.3.2 CALIBRATION MODEL SELECT (p170)								○							○
8.4.3.3 LED & MEAS AREA ADJ (p171)								○							○
8.4.3.4 CCT CALIBRATION (p172)								○							○
8.4.3.5 CCT CALIBRATION CHECK (p175)								○							○
8.4.3.6 R CALIBRATION (p178)								○							○
8.4.3.7 R CALIBRATION CHECK (p180)								○							○
8.4.3.8 LED ADJUSTMENT (CORNEA) (p182)								○							○
8.5.1 Intensity of LED for corneal illumination (p189)	○														
8.5.2 AUTO TRC ADJUST (p190)												○			
8.5.3 TRC LIMIT ADJUST (p191)							○								
8.5.4 CHIN CHECK (p192)															
8.5.5 CURSOR BOARD (p192)															

9.8.2 Boards and adjustment items

Replacement part	7.2.15 Printer interface board (80606-00019) (p101)	7.2.14 Right panel SW board (30601-BA15) (p100)	7.2.13 U/D SW board (30601-BA09) (p100)	7.2.12 Left panel SW board (30601-BA07) (p99)	7.2.11 DC-AC inverter (18535-E010) (p99)	7.2.10 Pachy board (18538-BA26) (p98)	7.2.9 Front/RL sensor board (18536-BA25) (p98)	7.2.8 Pressure sensor board (18536-BA22) (p97)	7.2.7 NT board (18536-BA21) (p97)	7.2.6 Solenoid board (18536-BA20) (p96)	7.2.5 SLPOS encoder board (18536-BA19) (p96)	7.2.4 LCD board (18536-BA06) (p95)	7.2.3 Base board (18536-BA05) (p95)	7.2.2 Driver board (18536-BA03) (p93)	7.2.1 Main board (p92)
Adjustment item															
8.1.6 Parameter settings (p125)															
8.3.1 Camera focus (p135)															
8.3.2 Optical reticle position (p136)															
8.3.3 NT camera position (p137)															
8.3.4 AL2 LED optical axis (p138)															
8.3.5 Alignment spot intensity (p139)															
8.3.6 NT board (p141)									○						
8.3.7 Fixation light position (p143)															
8.3.8 Solenoid brake (p146)										○					
8.3.9 Puffed air pressure (p147)								○							
8.3.10 Reference marker position (p147)															
8.3.12 Focusing indicator check (p150)															
8.3.13 Model eye measurements (p151)									○						
8.3.14 A/B constant (p154)									○						
8.4.1 Pachy illumination ASSY (p157)															
8.4.2 Pachy photodetector ASSY (p163)															
8.4.3.1 PARALLELISM ADJUSTMENT (p168)															
8.4.3.2 CALIBRATION MODEL SELECT (p170)															
8.4.3.3 LED & MEAS AREA ADJ (p171)															
8.4.3.4 CCT CALIBRATION (p172)															
8.4.3.5 CCT CALIBRATION CHECK (p175)															
8.4.3.6 R CALIBRATION (p178)															
8.4.3.7 R CALIBRATION CHECK (p180)															
8.4.3.8 LED ADJUSTMENT (CORNEA) (p182)															
8.5.1 Intensity of LED for corneal illumination (p189)															
8.5.2 AUTO TRC ADJUST (p190)															
8.5.3 TRC LIMIT ADJUST (p191)															
8.5.4 CHIN CHECK (p192)															
8.5.5 CURSOR BOARD (p192)															
8.6 Settings After Replacement of Measuring Unit (p193)															
8.7 Software Upgrade (p197)															
8.8 EEPROM Backup (p198)	○														
8.9 Restoring EEPROM Data (p199)		○													
8.10.1 BACKUP (p200)	○														
8.10.2 RESTORE (p201)		○													
8.11 Network (p202)															
8.12 Cleaning (p205)															

9.8.3 Electrical parts and adjustment items

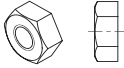
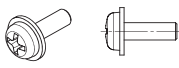
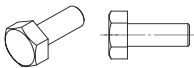


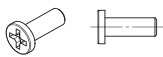
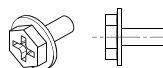


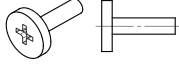

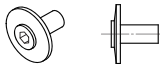


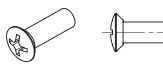
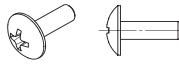

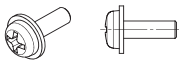
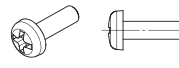
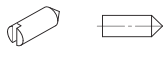


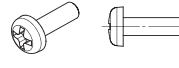

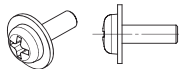
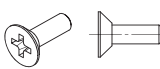

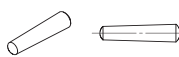
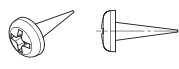



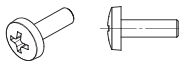
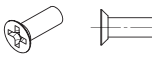
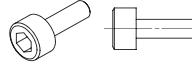

Replacement part	7.3.17 TFT color LCD (80607-00024) (p116)	7.3.16 Printer (80606-00018) (p115)	7.3.15 Switching power supply (80602-00102) (p114)	7.3.14.2 BW CCD camera of pachy photodetector ASSY (p113)	7.3.14.1 BW CCD camera of CCD camera ASSY (p113)	7.3.13 Chinrest (15601-EA53) (p112)	7.3.12 Primary unit (15601-EA01) (p111)	7.3.11 Gear-equipped brushless motor (15601-E008) (p111)	7.3.10 Pachy LED (18538-EA75) (p109)	7.3.9 F/B sensor (18537-EA46) (p108)	7.3.8 R/L sensor (18537-EA45) (p108)	7.3.7 F/B motor (18537-EA43) (p107)	7.3.6 R/L motor (18537-EA42) (p106)	7.3.5 Solenoid (18536-EA71) (p105)	7.3.4 U/D sensor (18536-EA47) (p104)	7.3.3 Front/R/L sensor (18536-EA33) (p104)	7.3.2 FIX LED (p103)	7.3.1 SLPOS sensor (18536-EA22) (p102)
Adjustment item																		
8.1.6 Parameter settings (p125)																		
8.3.1 Camera focus (p135)																		
8.3.2 Optical reticle position (p136)																		
8.3.3 NT camera position (p137)					○													
8.3.4 AL2 LED optical axis (p138)																		
8.3.5 Alignment spot intensity (p139)																		
8.3.6 NT board (p141)																		
8.3.7 Fixation light position (p143)																○		
8.3.8 Solenoid brake (p146)														○				
8.3.9 Puffed air pressure (p147)														○				
8.3.10 Reference marker position (p147)																		
8.3.12 Focusing indicator check (p150)																		
8.3.13 Model eye measurements (p151)														○				
8.3.14 A/B constant (p154)																		
8.4.1 Pachy illumination ASSY (p157)																		
8.4.2 Pachy photodetector ASSY (p163)					○													
8.4.3.1 PARALLELISM ADJUSTMENT (p168)					○				○									
8.4.3.2 CALIBRATION MODEL SELECT (p170)					○				○									
8.4.3.3 LED & MEAS AREA ADJ (p171)					○				○									
8.4.3.4 CCT CALIBRATION (p172)					○				○									
8.4.3.5 CCT CALIBRATION CHECK (p175)					○				○									
8.4.3.6 R CALIBRATION (p178)					○				○									
8.4.3.7 R CALIBRATION CHECK (p180)					○				○									
8.4.3.8 LED ADJUSTMENT (CORNEA) (p182)					○				○									
8.5.1 Intensity of LED for corneal illumination (p189)																		○
8.5.2 AUTO TRC ADJUST (p190)								○										
8.5.3 TRC LIMIT ADJUST (p191)										○					○			
8.5.4 CHIN CHECK (p192)																		○
8.5.5 CURSOR BOARD (p192)																		○
8.6 Settings After Replacement of Measuring Unit (p193)																		
8.7 Software Upgrade (p197)																		
8.8 EEPROM Backup (p198)																		
8.9 Restoring EEPROM Data (p199)																		

7.3.17 TFT color LCD (80607-00024) (p116)				
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7.3.14.2 BW CCD camera of pachy photodetector ASSY (p113)				
7.3.14.1 BW CCD camera of CCD camera ASSY (p113)				
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7.3.9 F/B sensor (18537-EA46) (p108)				
7.3.8 R/L sensor (18537-EA45) (p108)				
7.3.7 F/B motor (18537-EA43) (p107)				
7.3.6 R/L motor (18537-EA42) (p106)				
7.3.5 Solenoid (18536-EA71) (p105)				
7.3.4 U/D sensor (18536-EA47) (p104)				
7.3.3 Front/RL sensor (18536-EA33) (p104)				
7.3.2 FIX LED (p103)				
7.3.1 SLPOS sensor (18536-EA22) (p102)				
Replacement part				
Adjustment item				
8.10.1 BACKUP (p200)				
8.10.2 RESTORE (p201)				
8.11 Network (p202)				
8.12 Cleaning (p205)				

9.9 Screw List

ネジ類記号表 / SCREWS LIST

処理 Treatment			
BGr	黒クロームメッキ Chrome plate:black	SUS	ステンレス Stainless
Cr	クロームメッキ Chrome plate	ZnCr3	三価クロメート Trivalent chromate
		※ZnBr3	三価黒クロメート Trivalent chromate:black ※(ZnBr3は省略) (ZnBr3 omitted)

N ナット六角(1種) HEXAGON NUT-1 	BS セムスネジ(SW+PW付) SEMS FASTENER(with SW+PW) 	HB 六角ボルト HEXAGON HEAD BOLT 	SP ピン平行 STRAIGHT PIN 
3N ナット六角(3種) HEXAGON NUT-3 	CK 小ネジ(0番1種なべ) MACHINE SCREW(Pan head) 	HC 小ネジ六角頭フランジ付き HEXAGON HEAD BOLT 	SW ワッシャスプリング SPRING WASHER 
3PW ワッシャ平(3種) WASHER-3 	3CK 小ネジ(0番1種なべ) MACHINE SCREW(Pan head) 	HH 止めネジ六角穴付 HEXAGON SOCKET SET SCREW 	TB シンヘッドネジ MACHINE SCREW(Thin head) 
4W ワッシャ平(特殊寸法) WASHER(Special size) 	CT 止め輪C型 RETAINING RING-C TYPE 	OC 小ネジ丸皿 MACHINE SCREW(Oval head) 	TC 小ネジトラス MACHINE SCREW(Truss head) 
5W ワッシャ(ポリスライダ) WASHER (Polyslider) 	DS セムスネジ(TW付) SEMS FASTENER(with TW) 	PC 小ネジなべ MACHINE SCREW(Pan head) 	TG 止めネジすり割付 SLOTTED SET SCREW 
6W ワッシャ(ナイロン) WASHER (Nylon) 	ET 止め輪E型 RETAINING RING-E TYPE 	PT タップタイトネジ(なべ) TAPPING SCREW(Pan head) 	TH 止めネジ六角穴付 HEXAGON SOCKET SET SCREW 
AS セムスネジ(SW+3PW付) SEMS FASTENER(with SW+3PW) 	FC 小ネジ皿 FLAT HEAD SCREW 	PW ワッシャ平小型丸(1種) WASHER-1 	TP テーパーピン TAPER PIN 
AT タッピンネジ(木ネジ用) TAPPING SCREW(Wood screw) 	FG 止めネジすり割付(平先) SLOTTED SET SCREW(Flat point) 	RP ピンスプリング SPRING PIN 	TW 歯付き座金 STAR WASHER 
BC 小ネジ(バインド) MACHINE SCREW(Binding head) 	FK 小ネジ(0番1種皿) MACHINE SCREW(Flat head) 	SB ボルト六角穴付 HEXAGON SOCKET HEAD CAP SCREW 	WW ワッシャ波 WAVE WASHER 



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